INSERTION INSTRUCTIONS FOR AMENDMENT 3 LETTERS 2 AND 3
NRC QUESTIONS & RESPONSES

Remove old pages and insert Amendment 3 pages as instructed below (amendment pages bear the amendment number and date at the foot of the page).

Vertical bars (change bars) have been placed in the outside margins of revised pages and tables to show the location of any technical changes originating with this amendment. Some pages bear a new amendment designation, but no change bars because revision on other pages caused a text shift. No change bars are used on new questions, responses and/or tables. Change bars are not applied to figures. Change bars from previous amendments have been deleted on pages revised by this amendment.

Transmittal letters along with these insertion instructions should be either filed or entered in Volume 1 of NRC Questions and Responses in front of any existing letters, instructions, distribution lists, etc.

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None	Letter 3 tab	after Ltr. 2 tab and TQ30-
None	remainder of pages including Ltr. 4 tab - see List of Effective Pages for contents	after Ltr. 3 tab

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NUCLEAR REGULATORY COMMISSION QUESTIONS AND RESPONSES
NEW HAVEN 1 AND 2

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QUESTION 21 NRC LETTER March 12, 1979

Using the estimated impact region (see Section 8.1.2.5), the Applicant should provide a breakdown of estimated procurement expenditures that will be spent during the construction period. This information should indicate the year expenditure by the county within which the expenditure will be made and by the four-digit industry code (Standard Industrial Classification Manual). This submission should also indicate the year the dollars are expressed in and the escalation rates applied to each category.

RESPONSE

The NRC has restated this question in its letter of May 25, 1979. Refer to NRC Revised Question 1 for the response to this question.

565010

QUESTION 22 NRC LETTER March 12, 1979

On separate tables, the Applicant should provide a breakdown of the payroll of direct and secondary employment for each year of construction and by the county of residence of workers. Indicate whether the dollar amounts are current or deflated. Provide the year dollars are deflated to and supply the relevant escalation rates applied to labor costs.

RESPONSE

The NRC has restated this question in its letter of May 25, 1979. Refer to NRC revised Question 2 for the response to this question.

565012

QUESTION 1 NRC LETTER April 23, 1979

Provide the record high 1-hr wet bulb temperature associated relative humidity at Syracuse for the period of record, 1955-1964. Also provide the average wet bulb temperatures used to determine the average discharge temperature. Provide any updated data since 1964.

RESPONSE

For the 1955 through 1964 period of record at Syracuse, the maximum hourly wet bulb temperature of 78°F was observed on several occasions. The relative humidity associated with one of these 78°F observations which results in the maximum cooling tower blowdown temperature, is 45 percent. This observation for the month of June, as well as all other monthly maximum and monthly average wet bulb temperatures and associated relative humidities used to predict the cooling tower blowdown temperatures reported in Table 5.1-1, New Haven-Nuclear, are listed in Table Q3-1-1.

All wet bulb temperatures and associated relative humidities covering a period of record from 1945 through 197[illegible] were similarly evaluated to determine monthly averages, and to select the monthly wet bulb temperature and associated relative humidity which results in the highest cooling tower blowdown temperature. These updated data are also presented in Table Q3-1-1. All data reported prior to 1965 represent hourly readings; the 1965 through 1975 data represent observations taken once every 3 hours.

For the updated period of record covering 1945 through 1975, there have been seven observations of 80°F wet bulb temperatures (e.g., three observations on June 29, 1945; one observation each on August 25, 1947 and July 20, 1972; two observations on August 9, 1973), which are higher than those indicated in Table Q3-1-1. However, in selecting the combinations of meteorological data which result in the maximum cooling tower blowdown temperatures, all wet bulb temperatures and associated relative humidities are evaluated by using the conceptual cooling tower performance curves. In these curves, cooling tower blowdown temperature increases with increasing wet bulb temperature and decreasing relative humidity. Accordingly, the 80°F observations are not listed on Table Q3-1-1, since the relative humidities associated with these observations resulted in lower cooling tower blowdown temperatures than the combinations of wet bulb temperatures and associated relative humidities which are listed in Table Q3-1-1.

565013

TABLE Q3-1-1

SUPPLEMENTARY METEOROLOGICAL DATA[1]

	1955-1964				1945-1975			
	Max 1-hr[2]		Average		Max 1-hr[2]		Average	
Month	WBT[3] (°F)	RH[4] (%)	WBT (°F)	RH (%)	WBT (°F)	RH (%)	WBT (°F)	RH (%)
Jan	55	[illegible]	32.5	74.4	56	45	33.1	74.0
Feb	52	47	32.9	[illegible]	52	47	33.0	74.0
Mar	55	30	34.1	72.0	62	27	35.2	71.2
Apr	67	42	42.0	66.0	67	40	41.7	65.9
May	73	42	51.1	63.5	73	42	50.6	66.0
Jun	78	45	59.6	66.2	78	42	59.8	67.6
Jul	[illegible]	36	63.7	67.7	76	38	63.9	68.5
Aug	[illegible]	43	62.6	69.6	79	43	62.8	71.0
Sep	72	36	56.3	70.8	76	40	56.6	72.8
Oct	68	48	47.1	70.7	69	42	47.5	72.1
Nov	64	48	38.9	71.8	68	50	38.9	73.2
Dec	52	45	33.6	76.0	61	59	33.9	75.3

REFERENCES AND NOTES:

1. National Climatic Center Meteorological Data, Syracuse Airport, Syracuse, N.Y. Asheville, N.C. 1945-1975

2. Each individual maximum value indicated in Table Q3-1-1 may not in all cases be the maximum value recorded. Rather, these data represent the maximum conditions, when used in conjunction with the conceptual cooling tower performance curves, which yield the maximum cooling tower blowdown cold water temperature.

3. Wet bulb temperature, °F

4. Relative humidity, percent associated with wet bulb temperature

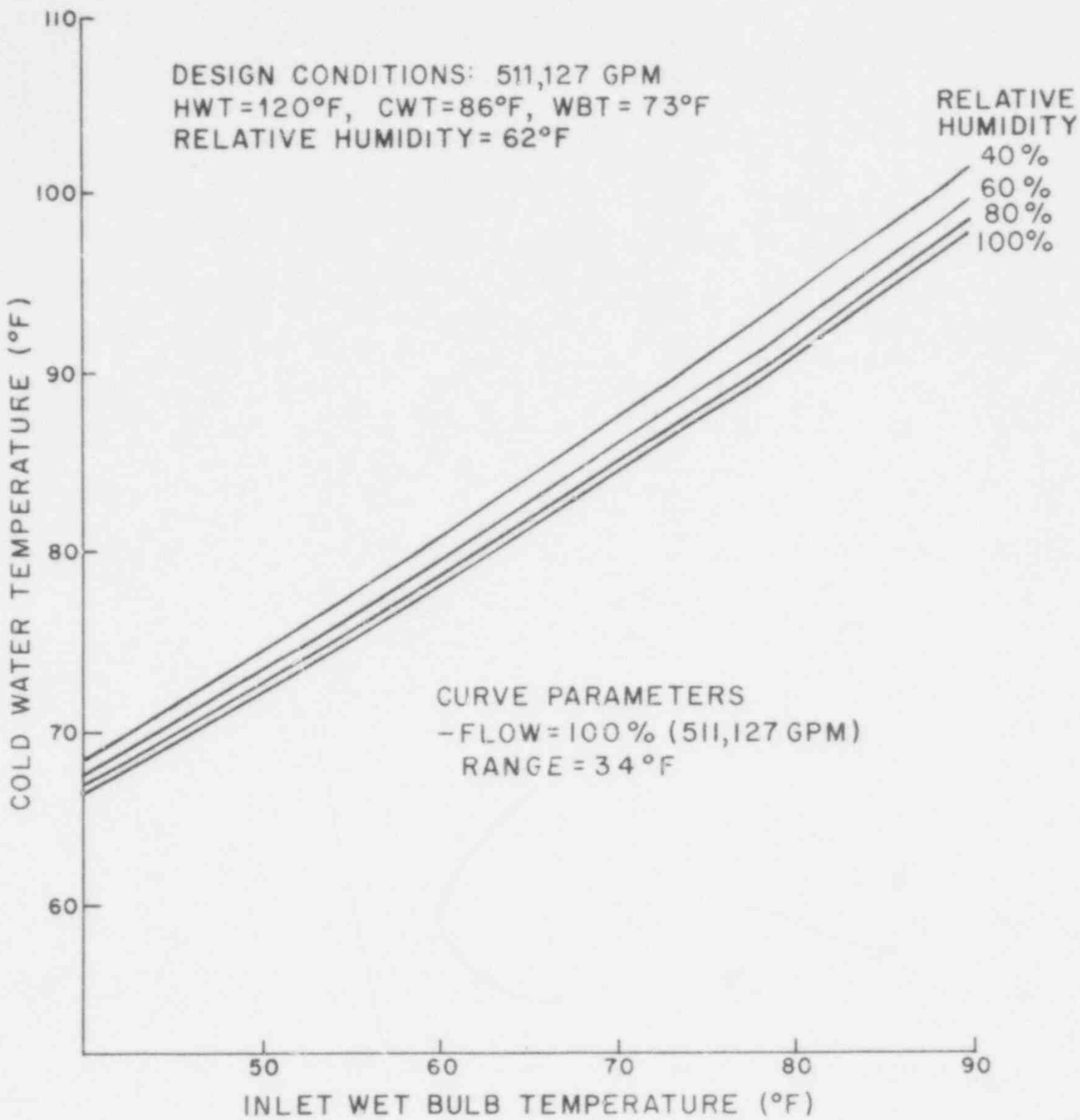
565014

QUESTION 2 NRC LETTER April 23, 1979

Provide the cooling tower design curve, i.e. the cold water temperature as a function of wet bulb temperature and relative humidity.

RESPONSE

The engineering for the natural draft cooling towers has not been completed. Figure Q3-2-1 is an estimated design curve based on the design conditions of the circulating water system.



NOTE:
THIS IS AN ESTIMATED DESIGN PERFORMANCE CURVE

SCOURCE: ZURN INDUSTRIES, INC.
COOLING TOWER DIVISION
OS-77026-12
2/23/78

565016

FIGURE Q3-2-1

NATURAL DRAFT COOLING TOWER PERFORMANCE CURVES UNITS 1 & 2 — MODEL Z-11855

NEW YORK STATE ELECTRIC & GAS CORPORATION
ENVIRONMENTAL REPORT

QUESTION 3 NRC LETTER April 23, 1979

What is the exact distance between the centers of the natural draft cooling towers? How is plume merging treated in the plume rise and drift deposition models?

RESPONSE

The distance between the centers of the natural draft cooling towers is 654.7 meters (2,148 ft). The cooling tower models for plume rise and drift deposition do not deal with plume merging of natural draft towers, but the ground-level impacts are modified to reflect the increased load caused by multiple units and towers. In the development of the model ENVIRN, it was considered that to neglect multiple plume merging, and thus not account for plume rise enhancement. would constitute a conservative assumption since higher values would be estimated for ground-level impacts. In the case of deposition, the magnitude of the impacts have been considered more significant than the downwind location. To account for a multiple source of drift, the deposition resulting from one unit has simply been multiplied by 2 - the number of units. The total dissolved solids for one unit were used as input in the production run of ENVIRN so that the drift and deposition were assumed to be doubled when the two units were considered. In view of the fact that the drift from multiple towers is dispersed over a wider area than that from a single tower, doubling the deposition values from a single tower and unit is conservative.

565017

QUESTION 4 NRC LETTER April 23, 1979

What are the criteria for plume visibility used in the plume model?

RESPONSE

The criteria for the cooling tower plume visibility in ENVIRN are to a certain extent dependent upon what plume parameter is being calculated. There are some common criteria for all visible plume parameters, but some differences also exist in order to reduce calculations or to present more specific information. The criteria distinctions are explained below. Basically, in order for the plume to be visible, the plume must be supersaturated. Hence, the water vapor concentration in the plume must exceed the saturation value for a given temperature at the specified downwind distance. When the volume flux of the plume increases to an extent that the water vapor content (d_x) becomes less than the saturation value at plume temperature the plume is no longer visible. Hence, the plume water vapor density and temperature change with downwind distance as a function of the volumetric flow rate of the plume across the predicted plume cross section (Environmental Report Section 6.1.3.2.3).

Certain differences exist in visible plume criteria for fogging and plume length calculations. When the model ENVIRN tests for ground-level fog, the fog subroutine calculates the total ambient and plume water vapor density at the plume temperature for the specified receptor distance and determines visibility reduction at ground level (if any) from a formulation reported by George[1]. In the case of visible plume length calculations, the plume water vapor density is tested against the saturation value at the ambient temperature rather than the saturation value at the plume temperature. The purpose of this modification is to enable the visible plume length to be calculated in one step, rather than require an iterative process which would calculate the plume temperature and water density at incremental downwind distances until the water vapor concentration decreases below the saturation value.

The assumption that the visible plume disappears when the water vapor density falls below the saturation value at the ambient temperature is conservative. The plume temperature is always higher than the ambient temperature at the same downwind distance and, in reality, causes the visible plume to evaporate at a shorter distance since the saturation value of water vapor density is higher within the plume. It should be noted that any level of visibility reduction constitutes a visible plume for the plume length calculation while, for ground-level fogging to be reported, the plume must reduce the existing ground-level visibility to less than or equal to 0.25 mi (heavy fog).

Reference for Question 4

1. George, J.J. Fog. Compendium of Meteorology, American Meteorological Society. Boston, Massachusetts, 1951

QUESTION 5 NRC LETTER April 23, 1979

Present available validation for the plume, drift, fogging, and icing models.

RESPONSE

The model ENVIRN, which predicts plume length, fogging, drift, and icing, has not been formally validated with field data. At the time of the initial model development (1972-1975), only limited field information was available for natural draft towers. The only natural draft tower plume data emanated from TVA's Paradise Steam Plant where plume length and height measurements were taken along with meteorological measurements[1,2]. Deposition data had been recorded at Forked River[3]. The only attempt to compare quantitative values from field studies with the model results occurred when the final plume height values, as estimated from a formulation used in the model, was informally hand calculated by Dr. James Austin[2], and checked against the field results. The model, as used for the natural draft tower, mainly used the formulations and assumptions of various investigators found in References 4 through 7.

Some modifications were implemented by Dr. Austin and the UE&C staff (ER Section 6.1.3.2.3 and Appendix 6.1A, Amendment 1). The modifications include the assumptions that:

1. A plume entrainment coefficient of 0.8 to calculate the plume rise coefficient in Briggs' plume rise formula better predicts the final height.

2. A plume entrainment coefficient of 0.3 for the γz term in ER Equation 6.1-41 provides a more reasonable plume radius value than a coefficient of 0.6 and is also more conservative with respect to plume length.

3. Atmospheric dispersion dominates after final plume rise so that the plume cross-section changes from a circular to an elliptical shape dependent upon stability.

4. The plume has no ground level fog/ice impacts when the windspeed at the tower top is less than 2.1 m/sec[4].

5. Salt droplets, normally expected to fall before final plume rise, deposit at receptors immediately beyond final rise, yielding more conservative offsite deposition values.

The results of estimated impacts for the New Haven site are such that any ENVIRN model inaccuracies are not expected to compromise the conclusion that the cooling tower impact is insignificant.

REFERENCES

1. Slawson, P.R., Coleman, J.H., and Frey, J.N. Some Observations on Cooling Tower Plume Behavior at the Paradise Steam Plant. Cooling Tower Environment - 1974, NTIS CONF 740302, 1975, p 147-160.

2. Austin, J. Personal Communication. Massachusetts Institute of Technology, 1979.

3. DeVine, J.C. The Forked River Program: A Case Study in Salt-Water Cooling. Cooling Tower Environment - 1974. NTIS CONF 740302, 1975. p 509-557.

4. Briggs, Gary A. Plume Rise Predictions in Lectures on Air Pollution and Environmental Impact Analyses. Duane Haugen, workshop coordinator, American Meteorological Society, Boston, 1975. p 59-111.

5. Hosler, C., Pena, J., and Pena, R. Determination of Salt Deposition Rates from Evaporative Cooling Towers. Pennsylvania State University, 1972.

6. Hanna, Steven R. Fog and Drift Deposition from Evaporative Cooling Towers. Nuclear Safety, Vol. 15, No. 2, March-April 1974.

7. George, J.J. Fog. Compendium of Meteorology, American Meteorological Society, Boston, 1951.

8. Kramer, Mark L. and Seymour, D.E. John E. Amos Cooling Tower Flight Program Data. American Electric Power Service Corporation, Environmental Engineering Division, Canton, OH, 1976.

565020

QUESTION 6 NRC LETTER April 23, 1979

In which specific areas of calculation are cloud cover, visibility, ceiling height, and precipitation used?

RESPONSE

Hourly observations of cloud cover, ceiling height, visibility, and precipitation have been incorporated into the ENVIRN model in order to more accurately characterize cooling tower impacts in conjunction with naturally occurring conditions. Certain natural conditions provide insight on which to base refinement of the ENVIRN predicted impacts. For example, there is no known case in which a cooling tower plume has descended below a cloud base once the lower plume edge has risen above the cloud base. Therefore, no fogging or icing is expected in conditions where broken or overcast skies are reported and where the lower plume edge ascends above the ceiling height.

Visibility and precipitation parameters are used in the fog/ice model to distinguish between man-made impacts and natural events. The ambient and plume water vapor concentrations are summed and the visibility is calculated as a function of the water vapor concentration[1]. Cooling tower fogging will not be predicted to occur if natural heavy fog (visibility ≤0.25 mi) already exists. On the other hand, if the cooling tower plume plus the naturally occurring visibility conditions reduce total visibility to 0.25 mi or less, cooling tower fogging is predicted to occur.

Precipitation is utilized in the model to determine whether the cooling tower plume is producing ice on surrounding objects at ground level. If precipitation already exists when the ambient temperature is below freezing (i.e., freezing rain), the icing from the cooling tower plume is considered to have negligible added impact. Therefore, hours of man-made icing from cooling tower plumes are discarded during naturally occurring freezing rain or drizzle.

Reference for Question 6

1. George, J.J. Fog. Compendium of Meteorology, American Meteorological Society, Boston, Massachusetts. 1951.

QUESTION 7 — NRC LETTER April 23, 1979

What is the reference for the table of values of p in Eq (6.1-38) on page 6.1-59?

RESPONSE

The power extrapolation law for the wind profile in ENVIRN utilizes stability-dependent exponential values of p taken from the EPA model RAMR. The model RAMR is the rural version of the EPA air quality model and so the stability-dependent values of p are considered valid for the New Haven site. The only revision in ENVIRN has been to retain a value of 0.55 for p during stability class G. RAMR does not handle class G. The use of the 0.55 value for stability class G is based upon an assumption that the wind profile does not differ significantly from that in stability class F. The table of p values for rural sites is contained in Reference 1.

Reference for Question 7

1. Environmental Protection Agency. User's Guide for RAM, Volume 1, Algorithm, Description and Use. EPA-600/3-78-016a. Environmental Sciences Research Laboratory, Research Triangle Park, NC 27711, 1978.

565022

QUESTION 8 NRC LETTER April 23, 1979

What is the reason for using 3 cycles of concentration in drift calculations instead of the more critical 6 cycles of concentration?

RESPONSE

The cooling tower environmental impact model ENVIRN has been designed to estimate long-term average drift impacts and not to predict transient conditions. The cooling tower salt deposition and drift values presented in ER Section 5.1.4 are based upon average cooling tower operating characteristics and a 1-year onsite meteorological data base. The cooling tower makeup water concentration using three cycles reflects the long-term average concentration. Therefore, to estimate the long-term average cooling tower drift impacts, three cycles of concentration in the makeup water have been considered appropriate to use as model input instead of the six-cycle transient value.

565023

NRC LETTER 4
(5/25/79)

565024

QUESTION 1 NRC LETTER May 25, 1979

Are there other public utility water users on the Mohawk River? Have they experienced difficulties with relying on their water use permit?

RESPONSE

To the Applicant's knowledge, there are no public utility water users on the Mohawk River.

QUESTION 2 NRC LETTER May 25, 1979

Have other industrial permittees on the Mohawk experienced difficulties with their permits because of the revocability of those permits?

RESPONSE

In general, the New York State Department of Transportation (DOT) does not grant permits for consumptive water use. The water use permits that they have granted are for a specified amount of water withdrawal, all of which is assumed to return to the river eventually. To the Applicant's knowledge, none of these permits have been revoked for their effect on flows or water level.

565 026

QUESTIONS 3 AND 4 NRC LETTER May 25, 1979

What information is available from either historic flow rates or historic navigation needs which would indicate a real risk of permit revocation?

Do you expect that such revocations would be temporary? How frequently and for what length of time do you estimate such revocations would occur?

RESPONSE

The Department of Transportation (DOT) has stated that if the flow in the Mohawk falls to 610-650 cfs, they begin to have problems with water levels. Data at Little Falls, N.Y., indicate that a 1-day low flow of 570 cfs has a recurrence interval of 5 years, a 7-day low flow of 610 cfs has a recurrence interval of 10 years, and a 30-day low flow of 640 cfs has a recurrence interval of 20 years. Thus, for the length of time and at the recurrence intervals given, there will be a marginal amount of flow for navigation.

A power station, such as the one proposed for New Haven, would consume approximately 66 cfs under worst case meteorological conditions. With this consumptive use, a flow of approximately 676-716 cfs will be required to meet navigation needs. The recurrence interval for low flows in the 676-716 cfs range would be approximately 2 years for the 1-day low flow, approximately 3-5 years for the 7-day low flow, and approximately 7-11 years for the 30-day low flow.

QUESTION 5 NRC LETTER May 25, 1979

Who could undertake efforts to reduce leakage from the locks? In what manner (generally)? At what cost (generally)?

RESPONSE

The locks and dams on the Mohawk are under the jurisdiction of the Department of Transportation. The Applicant has no information on the costs involved or the methods which could be used in reducing leakage from the locks and dams.

QUESTION 6 NRC LETTER May 25, 1979

What inquiries have you made into potential agreements and/or other provisions for Department of Transportation releases from the reservoir during periods of low flow? What indication do you have of the likelihood that circumstances would exist during plant operation that would prevent such releases sufficient to avoid revocation of an electric utility's water use permit?

RESPONSE

The Applicant and its consultant have discussed with the Department of Transportation (DOT) several schemes of flow augmentation including the possible expansion of Hinckley Reservoir, changes in the operation of Hinckley Reservoir, and building a reservoir solely for plant water needs.

Department of Transportation policy states that regardless of the flow augmentation scheme used, navigation needs are the primary concern and all other concerns are secondary. In addition, regardless of any agreements made with the DOT, they cannot issue an irrevocable water use permit. The revocable permit which the DOT could issue might be revoked in times of low flow due to a lack of surplus water. The risks associated with developing a multi-billion dollar power plant on a water body where the permit for water supply could be revoked for reasons not under control of the owner of the plant were not acceptable. This is especially true considering there are other available sites not subject to such conditions.

565 029

REVISED QUESTION 1 NRC LETTER April 23, 1979
(Formerly Question 21, NRC Letter March 12, 1979)

1. Using the estimated impact region (see Section 8.1.2.5), the Applicant should provide a breakdown of estimated procurement expenditures that will be spent during the construction period. This information should indicate the year in which the expenditure will be made and the four-digit industry code (Standard Industrial Classification Manual) for each expenditure category. This submission should also indicate the year the dollars are expressed in and the escalation rates applied to each category.

RESPONSE

Table RQ1-1 provides a breakdown of estimated procurement expenditures that will be spent during the construction period.

TABLE RQ1-1

REGIONAL ESTIMATED MATERIAL PROCUREMENT
NEW HAVEN UNITS 1 AND 2
($1,000's)

Code	Title	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
057	Fuel and Related Products	225	275	445	455	410	290	275	140	85	15
062	Paint and Paint Material	-	-	-	10	30	1,435	1,385	1,485	1,410	-
080	Lumber and Wood Products	30	155	325	725	735	605	450	20	10	5
090	Pulp, Paper and Allied Products	70	90	145	150	135	120	90	45	30	5
101	Iron and Steel	445	360	945	1,240	1,845	1,580	1,925	860	555	15
104	Hardwar	120	150	240	245	220	160	150	75	45	10
105	Plumbi , Fixtures	-	-	-	-	55	80	100	80	45	-
107	Fabrication Structural Metal Products	295	245	630	830	1,230	1,050	1,285	565	365	10
117	Electrical Machinery and Equipment	-	-	205	500	880	1,505	950	1,615	265	75
120	Furniture	430	575	865	925	835	705	630	480	225	105
130	Non-Metalic Products	30	490	2,905	4,665	7,940	8,960	5,880	7,530	770	2,110
140	Transportation Equipment	120	150	245	250	290	165	150	80	50	10
	Unallocated Construction Support Material	1,200	1,500	2,425	2,470	2,230	1,615	1,495	760	465	80
	TOTAL	2,965	3,990	9,375	12,465	16,835	18,270	14,765	13,735	4,320	2,440

NOTES:

1. The above material dollars are escalated at the rate of 3.4 percent in 1978 and 1979 and 1.9 percent thereafter.
2. Base year for all dollars is January 1, 1978
3. BLS-SIC source document is the Producer Prices and Price Indexes, Catalog No. L53-140

REVISED QUESTION 2
(Formerly Question 22, NRC Letter, March 12, 1979)

The Applicant should provide a breakdown of the payroll for direct employment for each year of construction within the estimated impact region. Indicate whether the dollar amounts are current or deflated. Provide the year dollars are deflated to and supply the relevant escalation rates applied to labor costs.

RESPONSE

Refer to Table 8.1-11, New Haven-Nuclear, for the response to this question. Total payroll is provided in current dollars and 1991 dollars. Escalation rates are provided in Table 8.2-1, New Haven-Nuclear.

INSERTION INSTRUCTIONS FOR AMENDMENT 3

Remove old pages and insert Amendment 3 pages as instructed below (amendment pages bear the amendment number and date at the foot of the page).

Vertical bars (change bars) have been placed in the outside margins of <u>revised</u> text pages and tables to show the location of any technical changes originating with this amendment. Some pages bear a new amendment designation, but no change bars, because revisions on other pages in that section caused a text shift. A few unrevised pages have been reprinted because they fall within a run of closely spaced revised pages. No change bars are used on figures or on <u>new</u> sections, appendices, questions and responses, etc. Change bars from previous amendments have been deleted on pages revised by this amendment.

Transmittal letters along with these insertion instructions should either be filed or entered in Volume I of Part I, in front of any existing letters, instructions, distribution lists, etc.

LEGEND

<u>Remove/Insert Columns</u>

Entries beginning with "T" or "F" designate table or figure numbers, respectively. All other entries are page numbers:

T2.3-14 = Table 2.3-14 FG5-3 = Figure G5-3

2.1-9 = Page 2.1-9 EP2-1 = Page EP2-1 vii = Page vii

Pages printed back to back are indicated by a "/":

1.2-5/6 = Page 1.2-5 backed by Page 1.2-6

T2.3-14(5 of 5)/15(1 of 3) = Table 2.3-14, sheet 5 of 5, backed by Table 2.3-15, sheet 1 of 3

<u>Location Column</u>

Ch = Chapter, V = Volume, S = Section, Ap = Appendix

Remove	Insert	Location
	PART I, VOLUME 1	
EP2-1 thru -11	EP2-1 thru -11	after Ch2 tab
2.1-vii/blank	2.1-vii/-viii	S2.1
2.1-29 thru -36	2.1-29 thru -36	
T2.1-47(1 of 1)/T2.1-48(1 of 1)	T2.1-47(1 of 1)/T2.1-48(1 of 1)	
F2.1-19 thru F2.1-22	F2.1-19 thru F2.1-26	
	PART I, VOLUME 2	
2.2-15/-16	2.2-15/-16	S2.2
2.2-163/-164	2.2-163 thru -164a	
2.2-189 thru -190a	2.2-189 thru -190a	
2.2-237 thru -238a	2.2-237/-238	
T2.2-232/blank	T2.2-232/blank	

POOR ORIGINAL

Remove	Insert	Location
	PART I, VOLUME 4	
2.4-31/-32	2.4-31 thru -32a	S2.4
2.4-36a/blank	2.4-36a/blank	
F2.4-7	F.24-7	
F2.4-12	F2.4-12	
F2.4-13	F2.4-13	
	PART I, VOLUME 5	
2.6-3 thru -4a	2.6-3 thru -4a	S2.6
EP3-1/-2	EP3-1/-2	after Ch3 tab
3-v thru -vii/blank	3-v thru -vii/blank	
3.1-1/-2	3.1-1/-2	S3.1
None	T3.1-1 thru -3 (all 1 of 1)	
	PART I, VOLUME 6	
T3.6-1(1/2 of 2)	T3.6-1(1/2 of 2)	S3.6
T3.6-3(1/2 of 2)	T3.6-3(1/2 of 2)	
T3.6-6/blank	T3.6-6/blank	
F3.6-3	F3.6-3	
None	F3.6-5	
3.7-1/-2	3.7-1/-2	S3.7
T3.7-1/-2(1 of 1)	T3.7-1/-2(1 of 2) T3.7-2(2 of 2)/blank	
None	T3.7-3(1 of 1)/blank	
EP4-1/-2	EP4.1-1/-2	after Ch4 tab
4-i thru -vii	4-i thru -vii	
4.1-2a 4.1-3 thru -6	4.1-3 thru -6d	S4.1
4.1-31/-32	4.1-31/-32	
4.1-35 thru -38c	4.1-35 thru -38d	
4.1-61 thru -67	4.1-61 thru -69	
T4.1-1/-2	T4.1-1/-2	
T4.1-15/blank	T4.1-15/-16	
None	F4.1-13	
4.5-1 thru -4a	4.5-1 thru -4a	S4.5

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Remove	Insert	Location
	PART I, VOLUME 7	
EP5-1/-2	EP5-1/-2	after Ch5 tab
5-i thru iv	5-i thru -iv	
5.1-27/-28	5.1-27/-28	S5.1
T5.1-23(1 of 1)/blank	T5.1-23(1/2 of 2)	
5.2-17/-18	5.2-17/-18	S5.2
T5.2-25/blank	T5.2-25/blank	
EP6-1/-2	EP6-1/-2	after Ch6 tab
6-i thru -iv	6-i thru -iv	
6.2-1/-2	6.2-1/-2	S6.2
EP7-1/blank	EP7-1/blank	after Ch7 tab
7.3-1/-2	7.3-1/-2	S7.3
T7.3-1/blank	T7.3-1/blank	
EP8-1/blank	EP8-1/blank	after Ch8 tab
8-i/-ii	8-i/-ii	
8.2-7/-8	8.2-7 thru -8a	S8.2
	PART I, VOLUME 14	
EP3.5B-1/blank	EP3.5B-1/blank	after Ap 3.5B tab
T3.5B-1 thru -4	T3.5B-1 thru -4	Ap 3.5B
EP5.2A-1/blank	EP5.2A-1/blank	after Ap 5.2A tab
T5.2A-2(1/2 of 4)	T5.2A-2(1/2 of 4)	Ap 5.2A
EP5.3A-1/blank	EP5.3A-1/blank	after Ap 5.3A tab
Series 001 II-1/-2	Series 001 II-1/-2	Ap 5.3A
Series 002 II-1/-2	Series 002 II-1/-2	
Series 002 II-5/-6	Series 002 II-5/-6	
Series 002 II-9/blank	Series 002 II-9/blank	
Series 003 II-1/-2	Series 003 II-1/-2	

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LIST OF EFFECTIVE PAGES
(Amendment 3, June 1979)

Page, Table (T), or Figure (F)	Amendment Number
2.1-i thru 2.1-v	1
2.1-vii/-viii	3
2.1-1 thru 2.1-6	0
2.1-7 thru 2.1-14a	2
2.1-15 thru 2.1-20	0
2.1-21 thru 2.1-27	0
2.1-28	1
2.1-29 thru 2.1-36	3
T2.1-1(1 of 1)	0
T2.1-2(1 of 1)	0
T2.1-3(1 of 1)	0
T2.1-4(1 of 1)	0
T2.1-5(1 of 1)	0
T2.1-6(1 of 1)	0
T2.1-7(1 of 1)	0
T2.1-8(1 of 1)	0
T2.1-9(1 of 1)	0
T2.1-10(1 of 1)	0
T2.1-11(1 of 1)	0
T2.1-12(1 of 1)	0
T2.1-13(1 of 1)	0
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T2.1-15(1 of 1)	0
T2.1-16(1 of 1)	0
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T2.1-18(1 of 1)	0
T2.1-19(1 of 1)	0
T2.1-20(1 of 3 thru 3 of 3)	0
T2.1-21(1 of 1)	2
T2.1-22(1 of 1)	0
T2.1-23(1 of 2 thru 2 of 2)	1
T2.1-23A(1 of 1)	1
T2.1-24(1 of 2 thru 2 of 2)	0
T2.1-24A(1 of 2 thru 2 of 2)	1
T2.1-25(1 of 1)	0
T2.1-26(1 of 9 thru 9 of 9)	0
T2.1-27(1 of 2 thru 2 of 2)	0
T.2.1-27A(1 of 2 thru 2 of 2)	2
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T2.1-44(1 of 1)	1
T2.1-45(1 of 2 thru 2 of 2)	0
T2.1-46(1 of 16 thru 5 of 16)	0
T2.1-46(6 of 16 thru 16 of 16)	1
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F2.1-6A	1
F2.1-7 thru 2.1-9	0
F2.1-9A	2
F2.1-16	1
F2.1-17 thru 2.1-18	0
F2.1-19 thru 2.1-26	3
2.2-i thru 2.2-iii	1
2.2-iv	2
2.2-v thru 2.2-xxix	1
2.2-1 thru 2.2-15	0
2.2-16	3
2.2-17 thru 2.2-36	0
2.2-37 thru 2.2-38	1
2.2-39 thru 2.2-84	0
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2.2-87 thru 2.2-99	0
2.2-100 thru 2.2-100a	1
2.2-101 thru 2.2-111	0
2.2-112 thru 2.2-112a	1
2.2-113 thru 2.2-132	0
2.2-133 thru 2.2-134b	1
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2.2-165 thru 2.2-180	0
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2.2-220 thru 2.2-220a	1
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2.2-224 thru 2.2-224a	1
2.2-225 thru 2.2-232	0
2.2-233 thru 2.2-234a	1
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2.2-237 thru 2.2-238	3
2.2-239 thru 2.2-242	0
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T2.2-7 (1 of 2 thru 2 of 2)	0
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T2.2-141(1 of 2 thru 2 of 2)	0
T2.2-142(1 of 1)	0
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T2.2-144 (1 of 3 thru 3 of 3)	0
T2.2-145 (1 of 2 thru 2 of 2)	0
T2.2-146 (1 of 1)	0
T2.2-147 (1 of 1)	0
T2.2-148 (1 of 1)	0
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T2.2-215 (1 of 4 thru 4 of 4)	0
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T2.2-224 (1 of 2 thru 2 of 2)	0
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T2.2-227 (1 of 3 thru 3 of 3)	0
T2.2-228 (1 of 1)	0
T2.2-229 (1 of 1)	0
T2.2-230 (1 of 1)	0
T2.2-231 (1 of 1)	0
T2.2-232 (1 of 1)	3
T2.2-233 (1 of 1)	0
T2.2-234 (1 of 3 thru 3 of 3)	0
T2.2-235 (1 of 1)	0
T2.2-236 (1 of 1)	0
T2.2-237 (1 of 1)	0
T2.2-238 (1 of 1)	0
T2.2-239 (1 of 2 thru 2 of 2)	0
T2.2-240 (1 of 1)	0
T2.2-241 (1 of 1)	0
T2.2-242 (1 of 1)	0
T2.2-243 (1 of 1)	0
T2.2-244 (1 of 1)	0
T2.2-245 (1 of 1)	0
T2.2-246 (1 of 1)	0
T2.2-247 (1 of 1)	0
T2.2-248 (1 of 1)	0
T2.2-249 (1 of 1)	0
T2.2-250 (1 of 1)	0
T2.2-251 (1 of 1)	0
T2.2-252 (1 of 1)	0
T2.2-253 (1 of 1)	[illegible]
T2.2-254 (1 of 4 thru 4 of 4)	[illegible]
T2.2-255 (1 of 1)	0
T2.2-256 (1 of 1)	0
T2.2-257 (1 of 1)	0
T2.2-258 (1 of 2 thru 2 of 2)	0
T2.2-259 (1 of 3 thru 3 of 3)	0
T2.2-260 (1 of 5 thru 5 of 5)	0
T2.2-261 (1 of 2 thru 2 of 2)	0
T2.2-262 (1 of 2 thru 2 of 2)	0
T2.2-263 (1 of 3 thru 3 of 3)	0
T2.2-264 (1 of 1)	0
T2.2-265 (1 of 1)	0
T2.2-266 (1 of 1)	0
T2.2-267 (1 of 1)	0
T2.2-268 (1 of 1)	0
T2.2-269 (1 of 1)	0

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Page, Table (T), or Figure (F)	Amendment Number
T2.3-30 (1 of 1)	0
T2.3-31 (1 of 1)	0
T2.3-32 (1 of 1)	0
T2.3-33 (1 of 1)	0
T2.3-34 (1 of 1)	0
T2.3-35 (1 of 1)	0
T2.3-36 (1 of 1)	0
T2.3-37 (1 of 1)	0
T2.3-38 (1 of 1)	0
T2.3-39 (1 of 1)	0
T2.3-40 (1 of 1)	0
T2.3-41 (1 of 1)	0
T2.3-42 (1 of 1)	0
T2.3-43 (1 of 1)	0
T2.3-44 (1 of 1)	0
T2.3-45 (1 of 1)	0
T2.3-46 (1 of 1)	0
T2.3-47 (1 of 1)	0
T2.3-48 (1 of 1)	0
T2.3-49 (1 of 1)	0
T2.3-50 (1 of 1)	0
T2.3-51 (1 of 1)	0
T2.3-52 (1 of 1)	0
T2.3-53 (1 of 1)	0
T2.3-54 (1 of 1)	0
T2.3-55 (1 of 1)	0
T2.3-56 (1 of 1)	0
T2.3-57 (1 of 1)	0
T2.3-58 (1 of 1)	0
T2.3-59 (1 of 1)	0
T2.3-60 (1 of 1)	0
T2.3-61 (1 of 1)	0
T2.3-62 (1 of 1)	0
T2.3-63 (1 of 1)	0
T2.3-64 (1 of 1)	0
T2.3-65 (1 of 1)	0
T2.3-66 (1 of 1)	0
T2.3-67 (1 of 1)	0
T2.3-68 (1 of 1)	0
T2.3-69 (1 of 1)	0
T2.3-70 (1 of 1)	0
T2.3-71 (1 of 1)	0
T2.3-72 (1 of 1)	0
T2.3-73 (1 of 1)	0
T2.3-74 (1 of 1)	0
T2.3-75 (1 of 1)	0
T2.3-76 (1 of 1)	0
T2.3-77 (1 of 1)	0
T2.3-78 (1 of 1)	0
T2.3-79 (1 of 1)	0
T2.3-80 (1 of 1)	0
T2.3-81 (1 of 1)	0
T2.3-82 (1 of 1)	0
T2.3-83 (1 of 1)	0
T2.3-84 (1 of 1)	0
T2.3-85 (1 of 1)	0
T2.3-86 (1 of 1)	0
T2.3-87 (1 of 1)	0
T2.3-88 (1 of 1)	0
T2.3-89 (1 of 1)	0
T2.3-90 (1 of 7 thru 7 of 7)	0
T2.3-91 (1 of 7 thru 7 of 7)	0
T2.3-92 (1 of 1)	0

Page, Table (T), or Figure (F)	Amendment Number
T2.4-12(1 of 1)	0
T2.4-13(1 of 1)	0
T2.4-14(1 of 2 thru 2 of 2)	0
T2.4-15(1 of 3 thru 3 of 3)	0
T2.4-16(1 of 2 thru 2 of 2)	0
T2.4-17(1 of 1)	0
T2.4-18(1 of 1)	0
T2.4-19(1 of 1)	0
T2.4-20(1 of 1)	0
T2.4-21(1 of 1)	0
T2.4-22(1 of 4 thru 4 of 4)	0
T2.4-23(1 of 1)	0
T2.4-24(1 of 1)	1
T2.4-25(1 of 1)	1
F2.4-1 thru 2.4-2	0
F2.4-3	1
F2.4-4 thru 2.4-6	0
F2.4-7	3
F2.4-8 thru 2.4-11	0
F2.4-12 thru 2.4-13	3
F2.4-14 thru 2.4-62	0
F2.4-63	1
2.5-i thru 2.5-v	1
2.5-vii thru 2.5-ix	1
2.5-0	0
2.5-1 thru 2.5-18d	1
2.5-19 thru 2.5-20	0
2.5-21	1
2.5-22 thru 2.5-24	0
2.5-25 thru 2.5-34a	1
2.5-35 thru 2.5-39	0
2.5-40 thru 2.5-46a	1
2.5-47 thru 2.5-49	0
2.5-50 thru 2.5-52	1
2.5-53 thru 2.5-74	0
2.5-75	1
2.5-76 thru 2.5-76c	2
2.5-77 thru 2.5-104	1
2.5-104a	1
2.5-104b thru 2.5-104c	2
2.5-105 thru 2.5-158	0
T2.5-1(1 of 55 thru 55 of 55)	0
T2.5-2(1 of 3 thru 3 of 3)	0
T2.5-3(1 of 4 thru 4 of 4)	0
T2.5-4(1 of 1)	0
T2.5-5(1 of 1)	1
T2.5-6(1 of 1)	1
T2.5-7(1 of 4 thru 4 of 4)	1
T2.5-8(1 of 1)	1
T2.5-9(1 of 1)	1
T2.5-10 delete notice	1
T2.5-11(1 of 1)	1
T2.5-12(1 of 3 thru 3 of 3)	2
T2.5-13(1 of 1)	2
F2.5-1 thru 2.5-5	0
F2.5-5A thru 2.5-5B	1
F2.5-6 thru 2.5-8	0
F2.5-9	1
F2.5-10 thru 2.5-11	0
F2.5-12 thru 2.5-13A	1
F2.5-14	1

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Page, Table (T), or Figure (F)	Amendment Number
F2.5-15 thru 2.5-48	0
F2.5-49 thru 2.5-62	1
F2.5-63	0
F2.5-64	1
F2.5-65 thru 2.5-66	0
F2.5-67 thru 2.5-69	2
2.6-i	2
2.6-iii	1
2.6-1 thru 2.6-2	0
2.6-3 thru 2.6-4a	3
2.6-5 thru 2.6-6	1
2.6-7 thru 2.6-10	2
F2.6-1 thru 2.6-16	0
2.7-i	1
2.7-iii	1
2.7-v	1
2.7-1 thru 2.7-5	0
T2.7-1(1 of 2 thru 2 of 2)	0
T2.7-2(1 of 2 thru 2 of 2)	0
T2.7-3(1 of 2 thru 2 of 2)	0
F2.7-1 thru 2.7-10	0
2.8-i	1
2.8-iii	1
2.8-v	1
2.8-1 thru 2.8-4	0
T2.8-1(1 of 1)	0
T2.8-2(1 of 2 thru 2 of 2)	0
T2.8-3(1 of 1)	0
T2.8-4(1 of 1)	0
T2.8-5(1 of 3 thru 3 of 3)	0
T2.8-6(1 of 1)	0
T2.8-7(1 of 1)	0
F2.8-1 thru 2.8-3	0

LIST OF EFFECTIVE PAGES
(Amendment 3, June 1979)

Page, Table (T), or Figure (F)	Amendment Number
3-i thru 3iii	0
3-v thru 3-vii	3
3-ix thru 3-xv	0
3.1-1 thru 3.1-2	3
T3.1-1	3
T3.1-2	3
T3.1-3	3
F3.1-1	0
F3.1-2	1
F3.1-3 thru F3.1-3A	1
F3.1-4	0
F3.1-5 thru F3.1-14	0
F3.1-15 thru F3.1-15B	1
3.2-1 thru 3.2-2	0
T3.2-1(1 of 1)	0
T3.2-2(1 of 1)	0
T3.2-3(1 of 1)	0
T3.2-4(1 of 1)	0
T3.2-5(1 of 1)	0
F3.2-1 thru 3.2-3	0
3.3-1 thru 3.3-2	0
T3.3-1(1 of 2 thru 2 of 2)	0
T3.3-2(1 of 1)	0
F3.3-1	0
Title Page	0
3.4-1 thru 3.4-7	0
T3.4-1(1 of 2 thru 2 of 2)	0
T3.4-2(1 of 1)	0
T3.4-3(1 of 2)	0
T3.4-3(2 of 2)	0
T3.4-4(1 of 1)	0
T3.4-5(1 of 1)	0
T3.4-6(1 of 1)	0
F3.4-1 thru 3.4-6	0
3.5-1 thru 3.5-10	0
T3.5-1(1 of 1)	0
T3.5-2(1 of 3 thru 3 of 3)	0
T3.5-3(1 of 2)	0
T3.5-3(2 of 2)	1
T3.5-4(1 of 1)	0
T3.5-5(1 of 2 thru 2 of 2)	0
T3.5-6(1 of 1)	0
T3.5-7(1 of 2 thru 2 of 2)	0
T3.5-8(1 of 2 thru 2 of 2)	0
T3.5-9(1 of 1)	0
T3.5-10(1 of 1)	0
T3.5-11(1 of 1)	0
F3.5-1 thru 3.5-26	0
3.6-1 thru 3.6-9	3
T3.6-1(1 of 2)	3
T3.6-1(2 of 2)	0
T3.6-2(1 of 2 thru 2 of 2)	0
T3.6-3(1 of 2 thru 2 of 2)	3
T3.6-4(1 of 2 thru 2 of 2)	0

Page, Table (T), or Figure (F)	Amendment Number
T3.6-5(1 of 2 thru 2 of 2)	0
T3.6-6(1 of 1)	3
F3.6-1 thru 3.6-2	0
F3.6-3	3
F3.6-4	0
F3.6-5	3
3.7-1	0
3.7-2	3
T3.7-1(1 of 1)	3
T3.7-2(1 of 2 thru 2 of 2)	3
T3.7-3	3
F3.7-1	0
3.8-1	0
3.9-1 thru 3.9-37	0
T3.9-1(1 of 1)	0
T3.9-2(1 of 1)	0
T3.9-3(1 of 3 thru 3 of 3)	0
T3.9-4(1 of 1)	0
T3.9-5(1 of 4 thru 4 of 4)	0
T3.9-6(1 of 2 thru 2 of 2)	0
T3.9-7(1 of 2 thru 2 of 2)	0
T3.9-8(1 of 8 thru 8 of 8)	1
T3.9-9(1 of 2 and 2 of 2)	0
T3.9-10(1 of 1)	0
T3.9-11(1 of 1)	0
F3.9-1 thru 3.9-72	0

LIST OF EFFECTIVE PAGES
(Amendment 3, June 1979)

Page, Table (T), or Figure (F)	Amendment Number
4-i thru 4-iv	3
4-v thru 4-vi	3
4-vii	3
4.1-1	0
4.1-2	0
4.1-2a	1
4.1-3 thru 4.1-6d	3
4.1-7 thru 4.1-10	1
4.1-11 thru 4.1-12	2
4.1-12a	1
4.1-13 thru 4.1-17	0
4.1-18	0
4.1-19	1
4.1-20 thru 4.1-30	0
4.1-31	3
4.1-32	0
4.1-33 thru 4.1-35	1
4.1-36 thru 4.1-38d	3
4.1-39 thru 4.1-61	0
4.1-62 thru 4.1-69	3
T4.1-1 (1 of 1)	3
T4.1-2 (1 of 1)	3
T4.1-3 (1 of 1)	0
T4.1-4 (1 of 2 thru 2 of 2)	0
T4.1-5 (1 of 1)	0
T4.1-6 (1 of 1)	0
T4.1-7 (1 of 2 thru 2 of 2)	0
T4.1-8 (1 of 2 thru 2 of 2)	0
T4.1-9 (1 of 1)	0
T4.1-10 (1 of 1)	1
T4.1-11 (1 of 2 thru 2 of 2)	1
T4.1-12 (1 of 1)	0
T4.1-13 (1 of 2 thru 2 of 2)	0
T4.1-14 (1 of 3 thru 3 of 3)	0
T4.1-15 (1 of 1)	1
T4.1-16 (1 of 1)	3
F4.1-1 thru F4.1-2	0
F4.1-3	1
F4.1-4 thru F4.1-10	0
F4.1-11 thru F.1-12	1
4.2-1 thru 4.2-30	0
T4.2-1 (1 of 2 thru 2 of 2)	0
T4.2-2 (1 of 3 thru 3 of 3)	0
T4.2-3 (1 of 1)	0
F4.2-1 thru F4.2-5	0
4.3-1	0
4.3-2	0
4.3-3	0
4.4-1 thru 4.4-2	0
T4.4-1 (1 of 1)	0
T4.4-2 (1 of 1)	0
4.5-1 thru 4.5-4a	3
4.5-5 thru 4.5-9	1
T4.5-1 (1 of 1)	1
T4.5-2 (1 of 2)	0

Page, Table (T), or Figure (F)	Amendment Number
T4.5-2(2 of 2)	1
T4.5-3(1 of 1)	0
4.6-1	0
F4.6-1	0

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LIST OF EFFECTIVE PAGES
(Amendment 3, June 1979)

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Page, Table (T), or Figure (F)	Amendment Number
5.2-18	0
T5.2-1(1 of 1)	0
T5.2-2(1 of 1)	0
T5.2-3(1 of 1)	0
T5.2-4(1 of 1)	0
T5.2-5(1 of 1)	0
T5.2-6(1 of 1)	0
T5.2-7(1 of 1)	0
T5.2-8(1 of 1)	0
T5.2-9(1 of 1)	0
T5.2-10(1 of 1)	0
T5.2-11(1 of 2 thru 2 of 2)	1
T5.2-12(1 of 1)	1
T5.2-13(1 of 1)	1
T5.2-14(1 of 1)	1
T5.2-15(1 of 1)	1
T5.2-16(1 of 2 thru 2 of 2)	1
T5.2-17(1 of 1)	1
T5.2-18(1 of 1)	1
T5.2-19(1 of 1)	2
T5.2-20(1 of 1)	1
T5.2-21(1 of 1)	1
T5.2-22(1 of 1)	1
T5.2-23(1 of 1)	0
T5.2-24(1 of 1)	1
T5.2-25(1 of 1)	3
F5.2-1 thru 5.2-3	0
5.3-1 thru 5.3.3	0
T5.3-1(1 of 1)	0
F5.3-1 thru 5.3-2	0
5.4-1	0
5.5-1 thru 5.5-7	0
5.5-8 thru 5.5-9	0
5.6-1 thru 5.6-8	0
5.6-9 thru 5.6-10a	1
5.6-11 thru 5.6-32	0
T5.6-1(1 of 1)	0
T5.6-2(1 of 1)	0
T5.6-3(1 of 1)	0
T5.6-4(1 of 1)	0
T5.6-5(1 of 1)	1
T5.6-6(1 of 1)	0
T5.6-7(1 of 1)	0
F5.6-1 thru 5.6-9	0
5.7-1 thru 5.7-3	0
T5.7-1(1 of 1)	0
5.8-1 thru 5.8-4	0

LIST OF EFFECTIVE PAGES
(Amendment 3, June 1979)

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Page, Table (T), or Figure (F)	Amendment Number
T6.1-36(1 of 2 thru 2 of 2)	0
T6.1-37(1 of 1)	0
T6.1-38(1 of 5 thru 5 of 5)	0
T6.1-39(1 of 2 thru 2 of 2)	0
T6.1-40(1 of 3 thru 3 of 3)	0
T6.1-41(1 of 1)	0
T6.1-42(1 of 2 thru 2 of 2)	0
T6.1-43(1 of 2 thru 2 of 2)	0
T6.1-44(1 of 2 thru 2 of 2)	2
F6.1-1 thru 6.1-26	0
6.2-1	3
6.2-2 thru 6.2-2a	1
6.2-3 thru 6.2-4	0
T6.2-1(1 of 4 thru 4 of 4)	0
T6.2-2(1 of 1)	1
6.3-1 thru 6.3-12	0
6.4-1	0

LIST OF EFFECTIVE PAGES
(Amendment 3, June 1979)

Page, Table (T), or Figure (F)	Amendment Number
7-i thru 7-ii	0
7-iii	0
7-v	0
7.1-1 thru 7.1-16	0
T7.1-1(1 of 1)	0
T7.1-2(1 of 2 thru 2 of 2)	0
T7.1-3(1 of 2 thru 2 of 2)	0
T7.1-4(1 of 1)	0
F7.1-1	0
7.2-1	0
7.3-1 thru 7.3-2	3
T7.3-1(1 of 1)	3

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LIST OF EFFECTIVE PAGES
(Amendment 3, June 1979)

Page, Table (T), or Figure (F)	Amendment Number
8-i thru 8-ii	3
8-iii thru 8-v	0
8.1-1 thru 8.1-13	0
T8.1-1 (1 of 2 thru 2 of 2)	1
T8.1-2 (1 of 1)	0
T8.1-3 (1 of 2 thru 2 of 2)	0
T8.1-4 (1 of 4 thru 4 of 4)	0
T8.1-5 (1 of 2 thru 2 of 2)	0
T8.1-6 (1 of 1)	0
T8.1-7 (1 of 1)	0
T8.1-8 (1 of 1)	0
T8.1-9 (1 of 1)	0
T8.1-10 (1 of 1)	0
T8.1-11 (1 of 1)	0
T8.1-12 (1 of 1)	0
T8.1-13 (1 of 1)	0
8.2-1 thru 8.2-4	0
8.2-5	2
8.2-6	0
8.2-7 thru 8.2-8a	3
8.2-9 thru 8.2-22	0
8.2-23 thru 8.2-24a	2
8.2-25 thru 8.2-32	0
T8.2-1 (1 of 3)	2
T8.2-1 (2 of 3 thru 3 of 3)	0
T8.2-2 (1 of 2 thru 2 of 2)	0
T8.2-3 (1 of 2 thru 2 of 2)	0
T8.2-4 (1 of 1)	0
T8.2-5 (1 of 1)	0
T8.2-6 (1 of 1)	0
T8.2-7 (1 of 1)	0
T8.2-8 (1 of 2 thru 2 of 2)	0
T8.2-9 (1 of 2 thru 2 of 2)	0
T8.2-10 (1 of 2 thru 2 of 2)	2
T8.2-11 (1 of 1)	0
T8.2-12 (1 of 1)	0
T8.2-13 (1 of 1)	0
T8.2-14 (1 of 1)	0
T8.2-15 (1 of 6)	1
T8.2-15 (2 of 6 thru 6 of 6)	0
T8.2-16 (1 of 1)	0
T8.2-17 (1 of 1)	0
T8.2-18 (1 of 1)	0
T8.2-19 (1 of 1)	0
T8.2-20 (1 of 1)	0
T8.2-21 (1 of 1)	0
T8.2-22 (1 of 1)	0
T8.2-23 (1 of 1)	0
T8.2-24 (1 of 1)	0

LIST OF EFFECTIVE PAGES
(Amendment 3, June 1979)

Page, Table (T), or Figure (F)	Amendment Number
App 3.5B Title Page	0
3.5B-1 thru 3.5B-2	0
T3.5B-1 (1 of 1)	3
T3.5B-2 (1 of 1)	3
T3.5B-3 (1 of 1)	3
T3.5B-4 (1 of 1)	0
T3.5B-5 (1 of 1)	0

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LIST OF EFFECTIVE PAGES
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Page, Table (T), or Figure (F)	Amendment Number
App 5.2A Title Page i	0
5.2A-1 thru 5.2A-13	0
T5.2A-1(1 of 2 thru 2 of 2)	1
T5.2A-2(1 of 4)	3
T5.2A-2(2 of 4 thru 4 of 4)	1
T5.2A-3(1 of 2)	0
T5.2A-3(2 of 2)	1

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LIST OF EFFECTIVE PAGES
(Amendment 3, June 1979)

LIST OF FIGURES

LIST OF FIGURES (Cont'd)

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This will be chiefly due to increased development in the Syracuse Standard Metropolitan Statistical Area, which is a major user of water from the Lake.

2.1.3.8 Ground Water

Throughout central New York State, ground water is a major source of water for domestic, agricultural, and industrial needs. Although secondary to surface water in quantity consumed, ground water supplied approximately 70 percent of Oswego County's total 1970 population of 100,897[70,73,74].

The use of ground water in Oswego County is through both public water systems and individually owned wells or springs. Out of the nine existing municipally owned public systems, seven utilize ground water (Table 2.1-45) and two systems, Oswego on Lake Ontario and Cleveland on Oneida Lake, utilize surface water Ground water consumption in the seven systems presently amounts to 5.32 mgd or 35 percent of the total water consumed in public systems. This is used primarily for domestic purposes and supplies approximately 25,140 people[72]. Industrial consumption accounts for only 30 percent of the ground water used[70]. Figure 2.1-17 shows the location of each public system with respect to the site.

The remainder of Oswego County's populace not connected to public water supplies, approximately 46,000 people, must rely on individually owned supplies. These are primarily drilled or dug wells; however, water is occasionally drawn directly from a spring or nearby stream. Water demands on individual supplies in Oswego County can vary from 100 gpd for small families up to 4,000 gpd for the larger farms[71].

Ground water use in the site vicinity is entirely by individual supplies. The extent of this use was determined by a well survey completed as part of the New Haven site study in February 1978. This study covered an area within a 1.5-mi radius of the proposed site. Table 2.1-46 summarizes the survey data and Figure 2.1-18 locates each well. The wells located within the proposed site boundary will be purchased. There are no uses planned for these wells during the operation of the station.

The survey showed that approximately 60 percent of the owners have drilled wells (6-inch or 8-inch diameter), approximately 40 percent have dug wells (36-inch to 48-inch diameter) and only a few have driven wells or use other sources. The drilled wells range up to 142 ft deep and usually draw water from the top 30 ft of the Oswego sandstone. Dug wells vary from 10 to 40 ft in depth and are predominantly in glacial till. A few dug wells in the village of New Haven benefit from a local deposit of outwash sands and gravels. In addition to wells, Table 2.1-46 indicates that three owners draw water directly from Butterfly Creek, one owner uses a spring, and four have spring fed ponds used only for watering livestock. No other surface water users have been identified within the 1.5-mi radius of the site.

The total average daily ground water consumption by the wells within the survey area is roughly 150,000 gpd, based conservatively on 500 gpd per family

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plus 3,000 gpd for the few large dairy farms (Well Nos. 123 and 246). There is no known use of ground water for irrigation in the vicinity.

The area that could be affected by any station effluents would be along the northerly ground water flow path between the site and Lake Ontario. The nearest wells along this path are of both the drilled and dug varieties (Nos. 230, 233, 241, 242, 243, 244) and will be over one-half mi from the station structures. In addition to the above wells, the area potentially affected by effluents also includes the seasonal lakeside communities of Demster Beach and Hickory Grove, 2.3 mi to the north. There are no public ground water systems down gradient of the site nor do any of the northerly flowing streams which pass through the site (Catfish and Butterfly Creeks) approach any public system. The nearest system is in the Town of Mexico which is supplied by three wells located almost 5 mi to the southeast of the site. Sections 4.1.8 and 5.6.3 analyze the extent of potential station influence on the local individual wells in greater detail.

The possibility of present or future ground water consumption exceeding the annual recharge is improbable. Within the 7 sq mi area encompassed by the well survey, the annual ground water recharge is approximately 1,131,400,000 gal, based on a mean annual precipitation of 36.5 inches (Section 2.3.1.3.4) 75-percent loss due to surface water runoff and evapotranspiration[71,73]. This large recharge could not easily be exceeded by the future consumption. Based on an estimated population of 3,141 for New Haven in the year 2000[5] and assuming a conservative per capita use of 200 gallons per capita daily, the average daily consumption would be only 0.63 mgd or 20 percent of the ground water recharge. Another factor which ensures low future consumption in the site vicinity is that the low yields of the underlying aquifers (Section 2.4.2) limit all local wells to the small domestic variety. Large industrial or public water systems could not be developed in the immediate site area without depending heavily upon a surface water source to supply their needs.

2.1.3.9 Floods

Section 2.4.1 describes streams in the site area and their watersheds.

These streams flow in a northerly direction and are perennial with a marsh or swamp as source. Butterfly Creek has a drainage area of 6.3 sq mi above the site, with 0.47 sq mi in swamp or marsh. The average slope of Butterfly Creek is 16.4 ft per mi.

The tributary of Catfish Creek, which lies immediately to the west of the site and is identified as tributary FW in this report, has a drainage area of 1.02 sq mi above the site, of which 0.16 sq mi is swamp or marsh. The average slope of this stream is 71 ft per mi.

Another tributary of Catfish Creek, identified as FE, flows through the site and will be diverted to near the site's western boundary. The drainage area of the diverted stream above the site is 1.06 sq mi, with the source being a 50-acre (0.08 sq mi) marsh located 1/2 mi south of the site. The diversion

channel has a trapezoidal cross section and is designed for flow greater than the 100-year flood flow. Approximately the first 1,700 ft to the north of State Route 104 drop quickly to below site grade with a slope averaging approximately 28 ft per 1,000. This section is excavated in bedrock or lined with riprap, where necessary, and has a 20-ft bottom width for the first 1,500 ft, and 2:1 side slopes.

After a 200 ft transition section, the next approximately 2,300 ft are lined with riprap with a 50-ft bottom width sloping 1.8 ft per 1,000 ft and 5:1 side slopes. The remainder of the channel, before it rejoins the existing stream bed at the northwest corner of the site, is grassed with a 60-ft bottom width and a 5:1 side slope. The bottom slope of this channel segment is 2.7 ft per 1,000. The channel diversion facilitates the development of the site by removing the source of flooding. There is no net area saved from flooding since the area gained by relocating the stream approximately equals that required for the diversion channel.

Table 2.1-47 gives the 50- and 100-year recurrence interval flood flows. These were obtained from runoff predictions of 50- and 100-year precipitation events through the use of the HEC-1 computer program[75]. The Clark unit hydrograph procedure[76] was used with the time of concentration and storage coefficients presented in Table 2.1-48. These values were obtained using regression equations presented in USGS water supply paper, "Model Hydrographs"[77]. Rainfall amounts were not reduced to account for initial loss or infiltration. Unit hydrographs for the Catfish Creek Tributary FE, FW, F, and Butterfly Creek are shown in Figures 2.1-23, -24, -25, and -26, respectively.

The 50- and 100-yr floods produced nearly the same degree of flooding on these streams. Figure 2.1-19 shows the water levels for the 100-yr flood. Figures 2.1-20, 2.1-21, and 2.1-22 show the water surface profiles for these streams.

The water levels and water surface profiles were computed by using HEC-2[78]. Representative cross-sections for the natural stream portions within the drainage basins were determined from Figures 3.1-1 and 3.1-2 and from USGS topographical maps[79]. The Mannings "n" values used in the HEC-2 analysis were conservatively selected to be 0.06 for the natural stream sections, 0.033 for the diverted stream sections that will be lined with riprap, and 0.1 for those sections of the diverted stream that will be seeded with grass.

2.1.4 References for Section 2.1

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TABLE 2.1-47

RUNOFF PREDICTIONS OF 50- AND 100-YEAR PRECIPITATION

Stream	Flood Flow 50-Year (cfs)	Flood Flow 100-Year (cfs)
Butterfly Creek	1,310	1,420
Tributary FW - Catfish Creek	640	720
Diverted Tributary FE - Catfish Creek	640	720

TABLE 2.1-48

PREDICTIONS OF CONCENTRATION TIME
AND STORAGE COEFFICIENT

Stream	Time of Concentration (hr)	Storage Coefficient (hr)
Butterfly Creek	9.7	5.9
Tributary FW* - Catfish Creek	2.4	1.2
Tributary FE* - Catfish Creek	2.4	1.3

NOTE:

* After construction which realigns FE, assuming the water from FW joins FE near the switchyard rather than at the natural junction farther downstream.

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CREEK
BUTTERFLY
DIVERSION CHANNEL - TRIBUTARY F
CATFISH CREEK - TRIBUTARY F
TRIBUTARY FW

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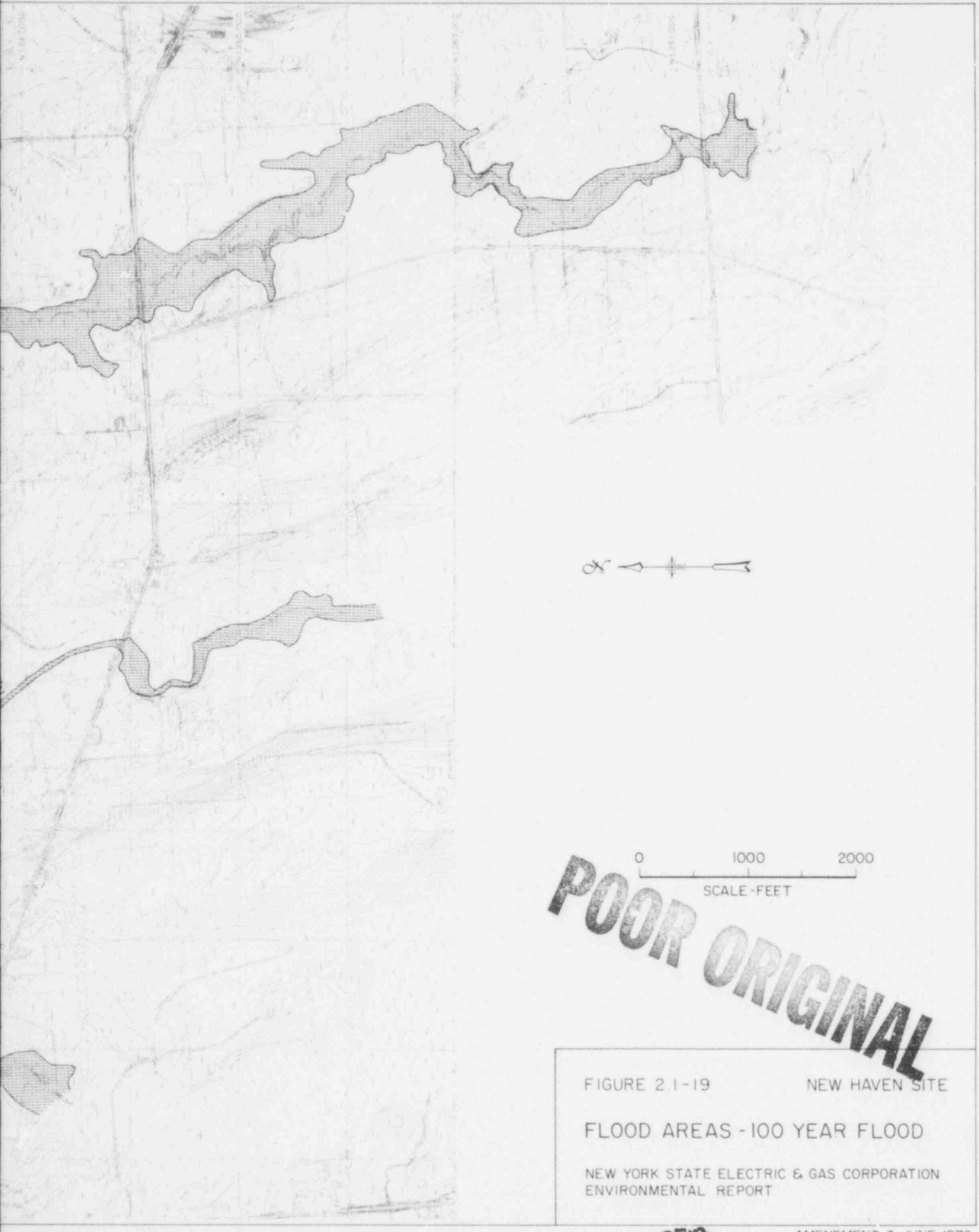

FIGURE 2.1-19 NEW HAVEN SITE

FLOOD AREAS - 100 YEAR FLOOD

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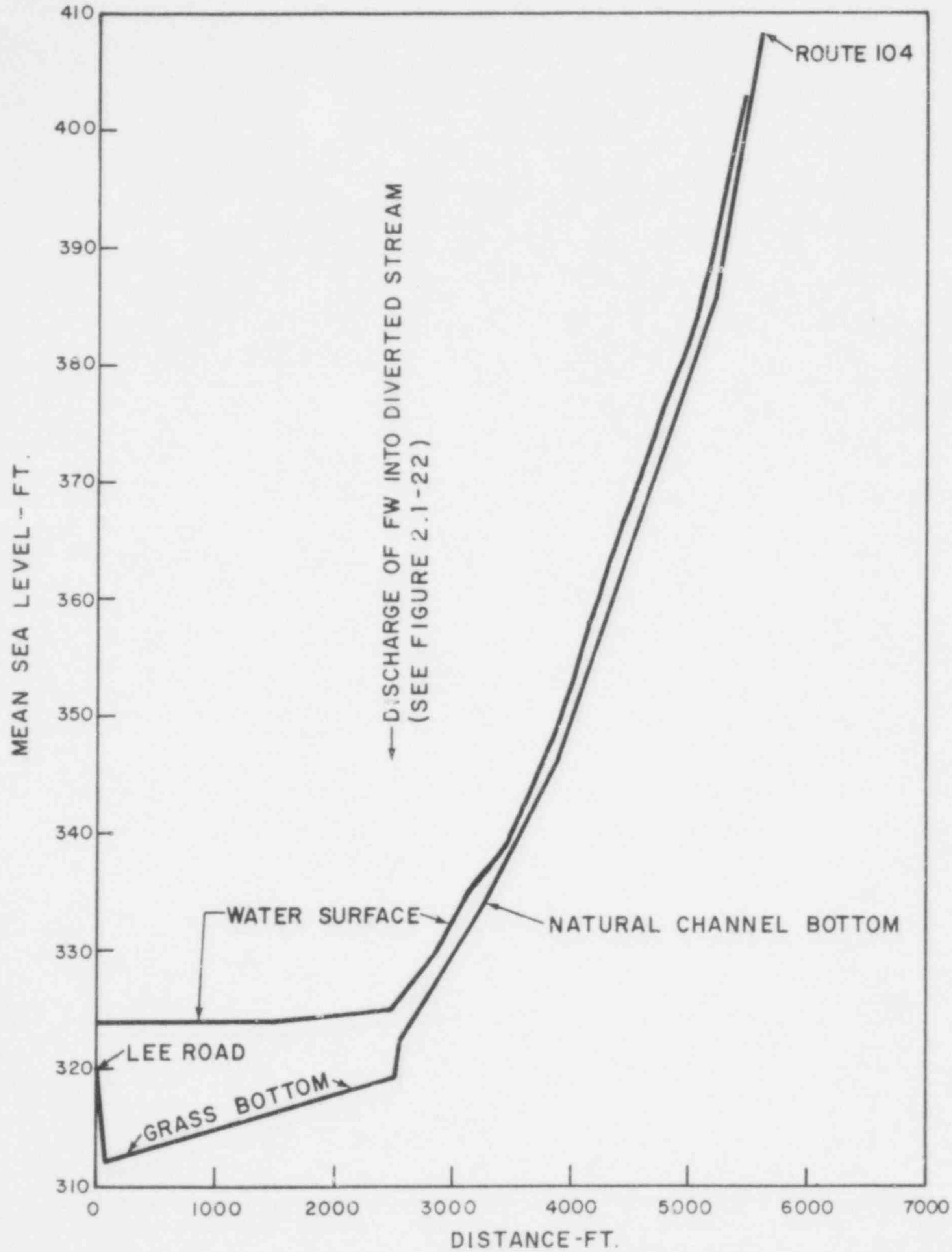

FIGURE 2.1-20 NEW HAVEN SITE

WATER SURFACE PROFILE
100 YEAR FLOOD
TRIBUTARY FW-TO DIVERTED STREAM

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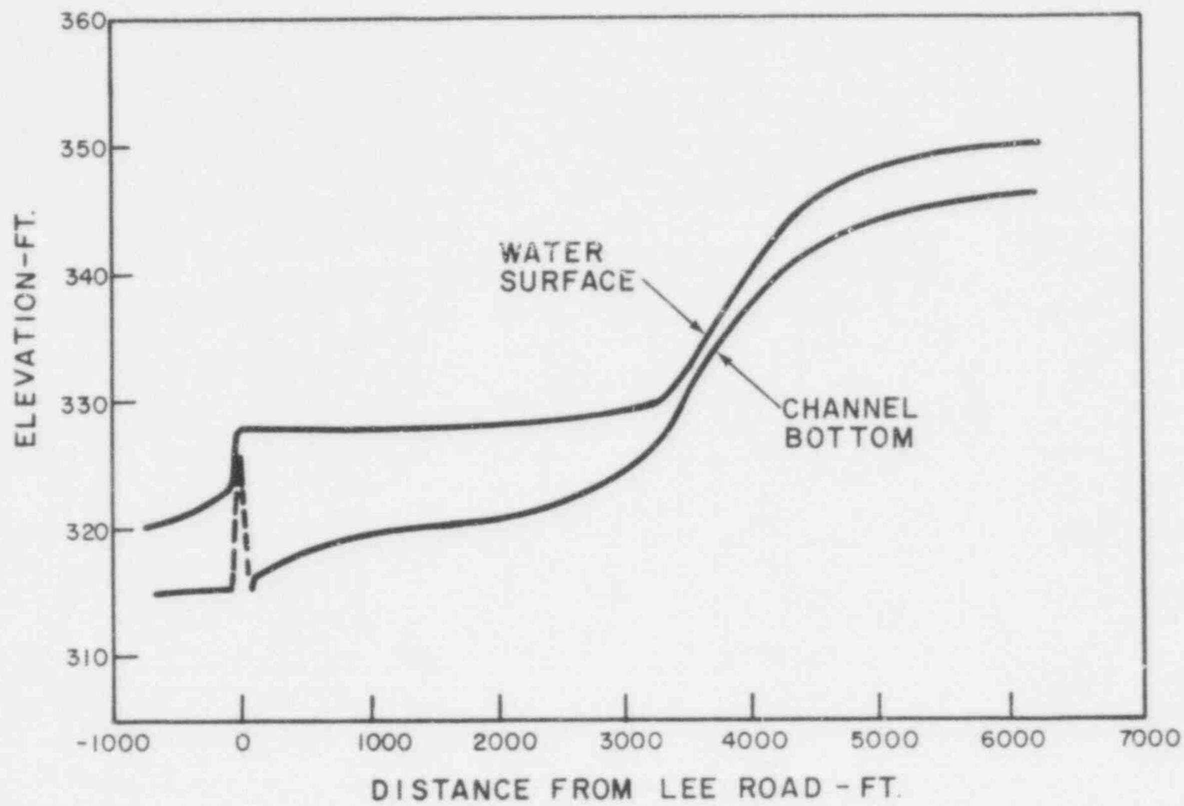

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FIGURE 2.1-21 NEW HAVEN SITE

WATER SURFACE PROFILE
100 YEAR FLOOD
BUTTERFLY CREEK

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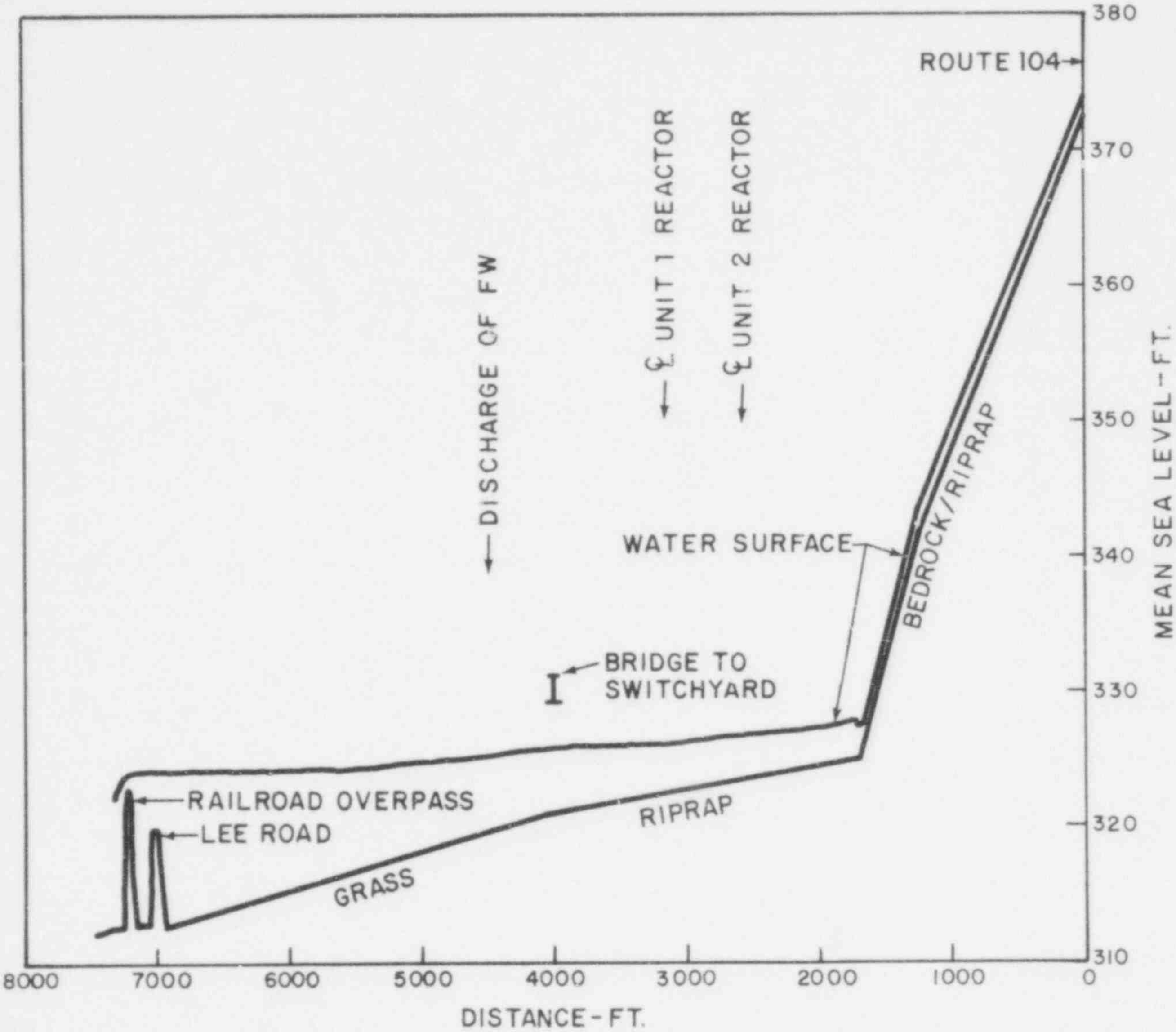

FIGURE 2.1-22 NEW HAVEN SITE

WATER SURFACE PROFILE
100 YEAR FLOOD
DIVERTED STREAM

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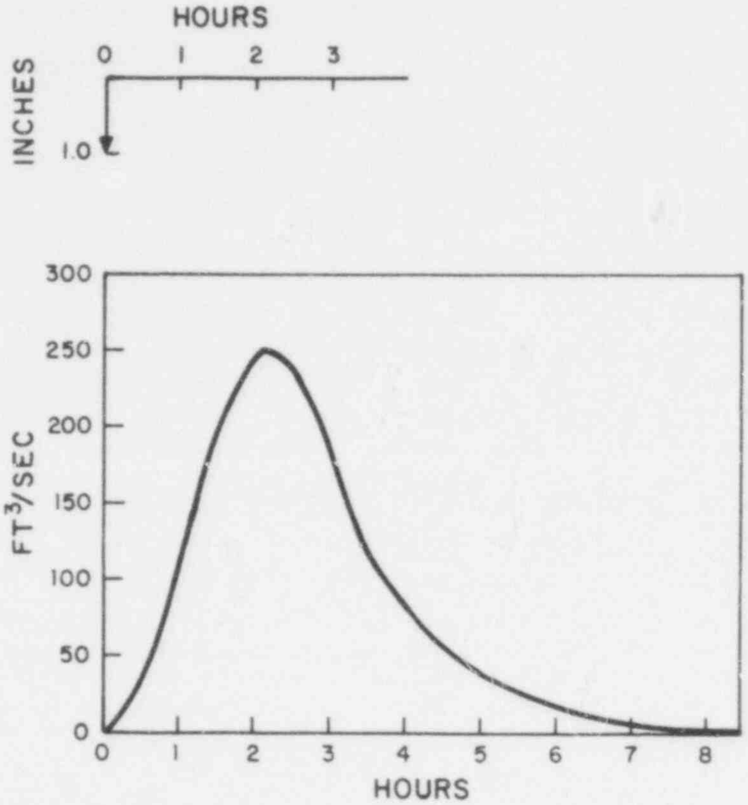

FIGURE 2.1-23 NEW HAVEN SITE

CLARK UNIT HYDROGRAPH

TRIBUTARY FE

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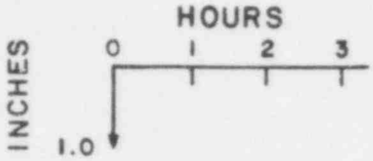

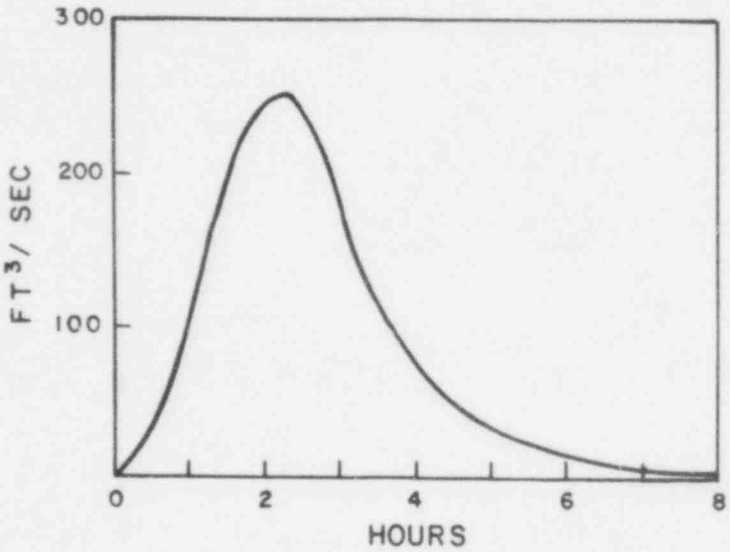

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FIGURE 2.1-24 NEW HAVEN SITE

CLARK UNIT HYDROGRAPH
TRIBUTARY FW

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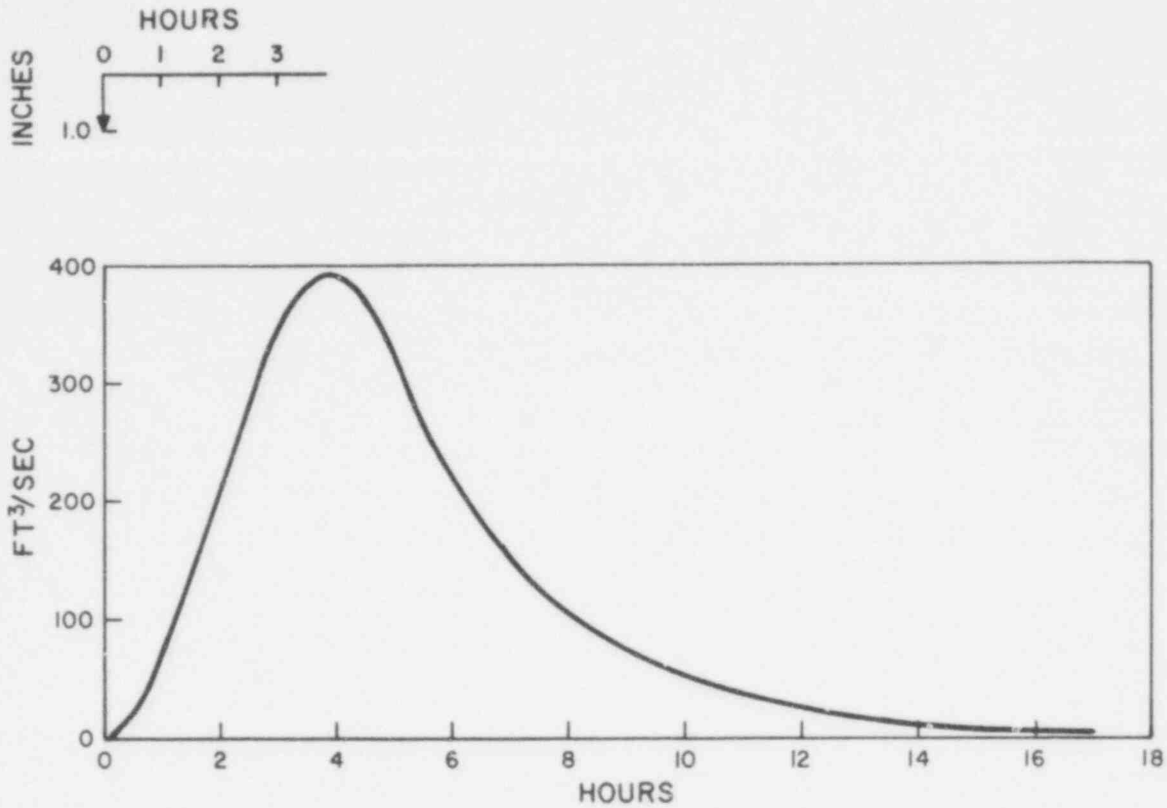

FIGURE 2.1-25 NEW HAVEN SITE

CLARK UNIT HYDROGRAPH

TRIBUTARY F

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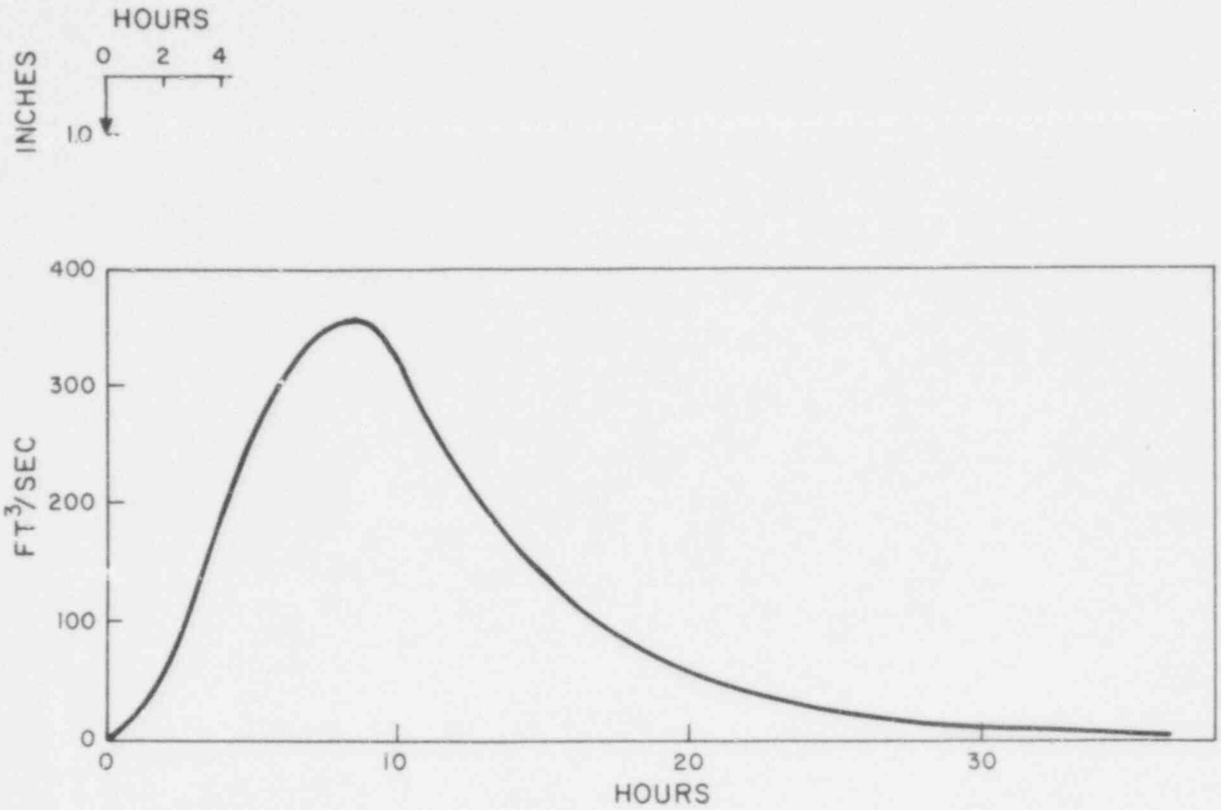

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FIGURE 2.1-26 NEW HAVEN SITE

CLARK UNIT HYDROGRAPH

BUTTERFLY CREEK

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consists of dense speckled alder growth, mostly confined to the wetter soils along the stream drainages. The shrub/sapling type contains few, if any, openings and is dominated by dense shrubs and/or saplings of pioneer tree species.

Pastured areas on the site have been typed as either pasture or improved pasture. Scattered trees and shrubs are present in those fields typed as pasture. Improved pasture denotes fields in which no trees or shrubs occur. In addition, livestock are periodically pastured in the various forest and shrub cover types which are also shown as pastured on the cover type map.

The meadow and some open field types of Table X-1 have been combined into a single hay field type. This type includes all areas which are usually mowed for hay but not plowed annually. Wetland types on the site include the open water and swamp types. The former occurs as scattered small man-made ponds. There are two swamp type areas in which standing water is present most of the year. Primarily open herbaceous and shrub vegetation is found in the swamp type along with numerous dead hardwood trees and some eastern hemlock.

The residential/commercial type designation identifies those areas of the site occupied by residential and commercial buildings and their surrounding areas (including storage) which are maintained by man's activities.

Other types identified on the map are hedgerows, abandoned orchards, corn and grain fields, transmission line right-of-way, and a private airstrip.

The onsite acreage for each of the cover types identified on the site is presented below:

Cover Type	Site Acreage	% of Total
MANAGED		
Hay field	255	19.7
Pasture	71	5.5
Improved pasture	54	4.2
Fallow	16	1.2
Topsoil removal	8	0.6
Corn	26	2.0
Grain	26	2.0
Residential/commercial	67	5.2
Airstrip	4	0.3
Junkyard	5	0.4
Roadways	4	0.3
Water	<1	<0.1

NATURAL WOODLANDS		
Hemlock/sugar maple/beech	86	6.7
Hemlock/sugar maple/beech (pastured)	52	4.0
Black locust	13	1.0
Red pine	4	0.3
Spruce/pine	4	0.3
Larch	2	0.2
SHRUB		
Swamp	8	0.6
Shrub/sampling	178	13.8
Shrub/sapling (pastured)	39	3.0
Shrub	146	11.3
Alder	78	6.0
Balsam fir/pine	4	0.3
Hedgerow	46	3.5
FIELD		
Open field	88	6.8
Abandoned orchard	10	0.8
TOTALS:	1,294	100.0

Native forest cover (hemlock/sugar maple/beech) occupies only 10.7 percent of the site acreage, with planted and introduced trees occurring on an additional 1.8 percent. The major cover of the site occurs as either shrub or shrub/sapling types, totalling 38.5 percent of the site area. Open fields, which also have a woody component, account for an additional 7.6 percent. The active agricultural cover type (i.e., hay, corn, grain, pasture, and improved pasture) account for 33.4 percent of the site area; Fallow agricultural land contributes an additional 1.2 percent. Of the active agricultural types, Hay contributes the largest portion. Residential/Commercial land constitutes 5.2 percent of the area.

2.2.1.3.2 Land Use in the Recent Past

The distribution of cover types on the site in 1956 is shown in Figure 2.2-5. This mapping was done through interpretation of 1956 black and white aerial photos of the site area.

In 1956 agricultural lands occurred over 47 percent of the site, with hay fields accounting for 42 percent of this total. In 1977 agricultural lands occurred over 35 percent of the site, with hay fields accounting for 20 percent of the total. Open fields were also more widespread in 1956, occurring over 14 percent of the site area compared to 7 percent in 1977. This 7-percent reduction in field communities is largely due to the abandonment of hay fields over the past 20 years, and the subsequent development of shrub communities. This change has resulted in an increase in

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are usually most abundant at depths between 100- and 300-ft in the Great Lakes[328], and generally live at or near the bottom. Lake trout seldom remain for extended periods at temperatures greater than 18.3C, preferring temperatures near 10C[328]. The warming of surface waters usually restricts them to deep water in summer.

Considerable information is available on the biology of lake trout, and excellent accounts of its life history have been provided by several authors[111,328,330,331]. Lake trout spawn once a year, usually in late summer or fall. The date depends on a variety of factors, which apparently include physiological differences among races, physical characteristics of the lake, latitude, weather conditions, and water temperatures. Temperatures of 8.9 to 13.9C have been reported at the time of spawning[111]. Most spawning occurs in October, but the breeding season extends into November in the Great Lakes and may continue for a month or more[328]. The typical spawning grounds of lake trout are wave- or current-swept rocky shoals at water depths ranging from less than 1- to 100-ft. Spawning is random, and no care is given the eggs which sink into crevices among the rocks. Considerable variation has been observed in spawning periods and habitat among different races. Christie[290] reported that spawning in eastern Lake Ontario was confined to a few well-known lake shoals. Most lake trout return to the same spawning grounds each year.

Gill netting was conducted in northeastern Lake Ontario by the NYSDEC in October and November 1977 to determine possible spawning grounds of lake trout[329]. Relatively large numbers of ripe and spent adults were captured in a small shallow area on the northeastern end of Stony Island, which is located approximately 25-mi from the Mexico Bay area. The shoal area had previously been a popular beach seining location for fishermen seeking native stocks of lake trout during years prior to their near extinction. This indirect evidence strongly suggested that lake trout spawned on a historic Lake Ontario spawning shoal for the first time since the demise of native stocks nearly 30 years ago[329]. Fry trap sampling on the shoal was conducted by the NYSDEC in early spring of 1978 to provide direct evidence of spawning success; however, many of the traps were disturbed by ice and no fry were captured[332]. The nearest documented spawning site in the vicinity of Mexico Bay was the shoal area of Stony Island[329]. There is no indication that the Mexico Bay study area is a lake trout spawning area.

The number of eggs produced by lake trout often varies widely among individuals of the same size, but the average number increases with increasing size of the fish. The number spawned during a season ranges from about 1,000 for small fish in inland lakes to as many as 18,000 for large lake trout from the Great Lakes[328]. Age V females collected during 1977 Lake Ontario netting activities by the NYSDEC produced between 3,854 and 9,391 eggs, with an average of 5,730 eggs[329]. These fish ranged in length from 554- to 682-mm.

Eggs hatch after four or more months under natural conditions, usually between mid-February and the end of March[330]. Newly hatched larvae are approximately 14-mm in length[330]. They spend about one month among the

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rocks on the spawning grounds, absorbing their large yolk sacs, and then disperse to deeper water. Their growth rate varies over their geographic range but is generally fairly rapid. An average growth of 2.8 mm/week was reported for young-of-the-year in Lake Superior between late June and late October, with first-year growth ranging from 64- to 100-mm in Lake Superior and from 87- to 125-mm in Lake Michigan[328,331]. Average lengths of lake trout for a number of northern lakes ranged from 99- to 267-mm for age II, 315- to 511-mm for age V, 354- to 643-mm for age IX and 412- to 709-mm for age XII fish[111]. The average lengths of various strains of lake trout planted in Lake Ontario since 1972 were 342- to 407-mm for age II, 471- to 534-mm for age III, 550- to 560-mm for age IV and 618-mm for age V fish[329]. These lengths indicated variations in growth rate between the three stocked strains with overall exceptional growth during the past 5 years in comparison to growth rates reported for other populations of lake trout in northern lakes.

Sexual maturity is usually reached at age VI or VII (or at about 600-mm in length), with males maturing before females[111]. Variations in age of maturity were observed between different strains of lake trout stocked in Lake Ontario[329]. Maturity was reached as early as age III for 4.3 to 32.4 percent of males and at age IV for 7.7 to 12.5 percent of females. Over 98 percent of males and 84 percent of females were mature at age V. These results indicated relatively early maturity, and the initial stock is expected to spawn several times before disappearing from the population.

Lake trout are long lived and grow to a large size; the oldest recorded age is 37 years and the largest size on record is 49.5-in (12,600-mm) and 102 pounds (46,300 g)[330]. Although rate of growth in length decreases among large lake trout, the rate of increase in weight rises markedly. This trend was illustrated by the average lengths and weights listed by Eschmeyer[328] for Lake Superior lake trout, which showed increasingly greater proportional growth in weight than in length after they had reached 300-mm in length. Lake trout collected during 1977 Mexico Bay sampling did not exhibit any consistent relationship between length groups and K-factors (Table 2.2-228). Mean K-factors ranged from 0.96 to 1.34 for various size groups of lake trout collected during June, July, and October, and no trends were apparent between months or between males and females. Mean K-factors calculated for lake trout collected during NYSDEC Lake Ontario sampling[329] increased steadily with age from 0.99 to 1.00 for age II, 1.09 to 1.10 for age IV, and 1.12 for age V.

The food habits of lake trout vary among fish of different sizes and from different waters. Small lake trout feed on crustaceans, insects, and small fish, and by the time they reach 375- to 450-mm, their diet is principally fish[328]. Experimental plantings of lake trout in Lake Ontario during the 1950s indicated that the young trout became piscivorous almost immediately upon release (usually as spring yearlings) and included progressively larger forage fishes in their diet as they grew[290]. Darters and small sculpins were taken first, juvenile smelt and alewife next, and finally adult smelt and alewife were added to the diet. Early studies in Lake Ontario (1928) indicated that the alewife was the dominant item in the diet of lake trout and that ciscoes predominated in trout stomachs after the annual inshore migration

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of alewife in the spring[290]. Analysis of the stomach content of 42 lake trout collected during 1977 Mexico Bay sampling indicated that they had fed

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water was indicated by depth comparisons for subsequent dates. Densities on 2 May decreased as distance from shore increased, whereas during the week of 9 May the trend was reversed (Figure 2.2-102). The only vertical distribution pattern observed occurred during the week of 9 May when densities were generally greater on the surface than near the bottom (Figure 2.2-103).

Yellow perch postlarvae were collected from 2 May through 27 June (Figure 2.2-79), with a peak mean density of 1.3/100 cu m during the week of 9 May (Appendix Tables 2.2E-34 and 2.2E-35). On all dates, day samples contained fewer larvae than night samples. Transect III had higher densities of postlarvae during the week of 9 May than either of the other two transects (Figure 2.2-101). Postlarvae had a depth distribution similar to that described for prolarvae during the week of 9 May; that is, as depth and distance offshore increased, densities also increased (Figure 2.2-102). Vertical distribution trends were not apparent (Figure 2.2-103).

Yellow perch young-of-the-year were collected on 18 July (Figure 2.2-79, Appendix Table 2.2E-36), but low densities precluded distribution comparisons.

Yellow perch have been common in ichthyoplankton collections throughout eastern Lake Ontario and have been dominant (in terms of abundance or density) during various periods. Yellow perch were collected in Mexico Bay and at other sites[12, 309] from late April through late May or early June (Table 2.2-255). During day sampling, the study at the Nine Mile Point-FitzPatrick site recorded mean densities for the study area similar, although not directly comparable, to night samples from the present study. The Sterling site studies also recorded mean densities for the study area of the same order of magnitude, indicating there was no appreciable difference in abundance of yellow perch larvae among the three sites.

Seventeen additional taxa were collected in the study area (Figure 2.2-79). The low densities of these taxa may in part reflect their reproductive life histories and the efficiency of sampling gear (Table 2.2-254). Many of these taxa have demersal and adhesive eggs. The Hensen nets used in the present study are most effective for collecting planktonic or semibouyant life stages. The majority of fish taxa resident in Mexico Bay spawn in shallow areas or in tributaries. Consequently, the most productive spawning areas were often those least accessible for sampling. Life stages of several taxa may not have been collected because the adult male protects the young.

Eight taxa (Cyprinidae, carp, emerald shiner, spottail shiner, trout-perch, threespine stickleback, _Lepomis_ spp., and _Cottus_ spp.) were collected in day and night samples at densities higher than 1/100 cu m (Appendix Tables 2.2E-37 and 2.2E-38). Each of the life stages for these taxa were collected sporadically precluding interpretation of their distribution.

Winter Ichthyoplankton Community

Ichthyoplankton sampling on Mexico Bay was not conducted during January, February, and March due to hazardous conditions on the lake; however,

estimates of species composition and relative abundance during this period are possible by extrapolation from three data bases:

1. Data collected in Mexico Bay from April through December 1977.

2. Data collected during entrainment/viability studies at James A. FitzPatrick Nuclear Power Station from January through December 1977[12]

3. Data collected in the vicinity of the Nine Mile Point Nuclear Power Station from April through December 1977[13]

Salmonidae was the only fish family collected (Section 2.2.2.1.6.4) in the study area which contained fall spawners. Burbot (Gadidae) was the only winter spawning species present in the area. There is no indication that the Mexico Bay study area is a spawning area for species of salmonids; these fall spawning species normally return to the areas in which they were stocked to spawn. The closest known stocking location for salmonids is the Salmon River Estuary, approximately six miles northeast of the study area. Therefore, eggs and larvae from salmonid species would not be expected to occur in the study area.

Spring ichthyoplankton collections in Mexico Bay, starting in April, produced early life stages of burbot and lake herring (Section 2.2.2.1.7). Burbot prolarvae and postlarvae and lake herring postlarvae were the first specimens to appear in the 1977 collections. Burbot and lake herring prolarvae and postlarvae were also collected during sampling in April and May in the vicinity of Nine Mile Point[36]. Densities of these life stages were similar for the Mexico Bay and Nine Mile Point study areas. Burbot eggs and larvae were also collected in February and May during entrainment sampling at the James A. FitzPatrick Power Station[12]. No new species were collected at the FitzPatrick Station from January through March 1977. It is therefore probable that only eggs and early life stages of burbot and lake herring would be present in Mexico Bay from January through March.

2.2.2.1.7.6 Statistical Treatment of Data

Statistical analyses using parametric analysis of variance (ANOVA) and Tukey's multiple comparison procedure were performed on mean density data (no./100 cu m) of each ichthyoplankton taxon life stage for which sufficient data were available

Data which included zero catches at approximately 50 percent or more of the sampling locations was considered insufficient for statistical analysis of spatial distribution. Tests were performed to determine significant differences ($P \leq 0.05$) in mean densities between depth contours, transects, levels within the water column, and time of day. Mean surface densities were tested for differences between all depth contours, and separate tests were conducted to compare mean densities between the 20-, 30-, 40-, and 50-ft depth contours, with surface, middepth and bottom densities combined. Comparisons of levels in the water column were performed on mean densities at the 20-

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through 50-ft contours, and day and night densities were compared for locations on Transect III. Separate tests were conducted for each sampling date when sufficient data were available. Significant interaction between main effects was prevalent in many of the tests; and when interaction occurred, Tukey's multiple comparison procedure was used to test for significant differences between mean densities at individual sampling locations or levels. An extensive number of analyses were performed, however, statistical results are presented only for tests which revealed significant patterns of distribution. Where no significant differences were detected or where trends were inconsistent, results are briefly described. Results are discussed by life stage and taxon in phylogenetic order.

Alewife

Sufficient data for statistical comparisons of alewife egg densities were available only for 18 July. Comparisons between transects, depth contours, and levels indicated that egg densities were not significantly different between levels but were significantly less abundant as depth increased and along Transect I (Table 2.2-256).

Sufficient data for statistical analysis of alewife prolarval densities were also available only for 18 July. Comparisons between transects, depth contours, and levels all yielded significant differences (Table 2.2-257). Surface densities were significantly greater at Transect I than at Transects III and V, and were significantly greater at Transect III than at Transect V. They were also significantly greater at the 20-ft depth contour than at other contours. Prolarvae were significantly more abundant at all levels at the 20-ft depth contour. Significant differences between levels in the water column occurred only at Transect I where surface densities were significantly greater that bottom densities at all but the 50-ft depth contour. No significant differences were noted between day and night densities at any depth contour or level.

Alewife postlarvae were abundant during much of the summer, and statistical comparisons were conducted on weekly data from 27 June through the week of 5 September (Tables 2.2-258 through 2.2-260). The many significant differences were noted, and distributional trends varied among sampling dates. On the first three weeks for which tests were performed (27 June, 4 July, and 11 July) densities were relatively low, and patterns of significant differences varied. Significant differences in mean densities at all water column levels combined and at the surface level on 27 June indicated that

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TABLE 2.2-232

K-FACTORS COMPUTED FOR BROWN BULLHEAD COLLECTED IN LAKE ONTARIO, JUNE AND SEPTEMBER 1977

Month	Size class (mm)	Males K-factors No.	Males K-factors Mean	Males K-factors Range	Female K-factors No.	Female K-factors Mean	Female K-factors Range	Sex undetermined K-factors No.	Sex undetermined K-factors Mean	Sex undetermined K-factors Range
June	181-190							1	1.17	NA*
	**									
	201-210							4	1.38	1.27-1.53
	211-220							1	1.36	NA
	221-230							11	1.31	1.04-1.42
	231-240							18	1.30	1.16-1.48
	241-250							19	1.3[illegible]	1.13-1.41
	251-260							14	1.31	1.19-1.51
	261-270							12	1.38	1.18-1.69
	271-280							4	1.44	1.40-1.50
	281-290							3	1.21	1.18-1.26
	291-300							2	1.29	1.18-1.39
	301-310							2	1.33	1.30-1.36
	311-320							1	1.34	NA
	**									
	331-340							2	1.22	1.11-1.33
September	171-180							1	1.57	NA
	**									
	201-210							7	1.37	1.20-1.46
	211-220							6	1.39	1.22-1.67
	221-230							6	1.35	1.27-1.50
	231-240							13	1.45	1.23-1.94
	241-250	1	1.67	NA				21	1.37	1.21-1.64
	251-260	2	1.53	1.52-1.53				19	1.43	1.20-1.65
	261-270				1	1.53	NA	21	1.43	1.23-1.68
	271-280							9	1.38	1.28-1.57
	281-290	1	1.60	NA				7	1.43	1.11-1.75
	291-300							4	1.53	1.31-1.8[illegible]
	301-310							1	1.38	NA
	**									
	321-330							1	1.20	NA

NOTES:
*Not applicable.
**Intervals for which no fish were collected.

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2.4.1.2 Onsite Streams

2.4.1.2.1 Introduction

The water quality of two onsite streams, Catfish and Butterfly Creeks, was characterized by monitoring general water quality parameters, nutrients, and indicators of contamination from April 1977 through March 1978. Samples were not collected if streams were not flowing or covered by ice. A complete set of data collected for the study is presented in Appendix 2.4A. Summary data are presented in Tables 2.4-14 and 2.4-15. Monthly means for each parameter are presented in Table 2.4-16.

2.4.1.2.2 Catfish Creek

The water quality survey of Catfish Creek and its eastern tributaries involved five sampling locations. A complete description of the locations sampled is presented in Section 6.2.

No published historical data for Catfish Creek or its tributaries are available for comparison to data from the present study. New York State Department of Environmental Conservation 1977, has designated Catfish Creek and the tributaries as Class C water and Class D, respectively. The Water Quality Standards are presented in Appendix 2.4A.

2.4.1.2.2.1 Overview of Physical and Water Quality Parameters

General Water Quality Parameters

Current Velocity

Data recorded at sampling Location S10 (Figure 2.4-63 or Figure 6.1-5) is presented in Table 2.4-24. Location 10 is located near the mouth of the creek and thus the measured velocities and flows are based on the contribution from essentially the entire drainage basin. Current velocity ranges from a minimum of 0.02 m/sec during June, July, and September to a maximum of 0.46 m/sec during May. Months with greater precipitation (April, May, October and November) exhibit higher velocities than months with lesser precipitation rates (June, July, August, and September). The average velocity for the sampling period is 0.07 m/sec.

Stream Flow

Stream flow (Table 2.4-24) at Location S10 ranges from a minimum of 0.23 cu m/sec during June to a maximum of 6.0 cu m/sec during November. Flow rates decrease from the spring months (April and May), reach a low-flow summer period (June, July, and August), and increase in the fall (October and November). The average flow rate for the sampling period is 1.52 cu m/sec.

As stated in Section 2.3.3.2.1, total precipitation during April 1, 1977 through March 31, 1978 was considerably higher than the climatological norm.

Therefore, the flows measured during 1977 may be somewhat higher than one would expect on a long term basis.

Drainage Area

The area above the N.Y. Central Railroad which is drained by the creek is 36.1 sq mi, and 36.8 sq mi are drained in all. The Catfish Creek basin contains 8.64 sq mi of swamp/marsh. The drainage is shown in Figure 2.4-63.

Gradient

The average gradient above the railroad is 4.3 ft/mi from 10 percent upstream to 85 percent upstream.

Temperature

The temperature of Catfish Creek ranged from 0.0°C to 25.5°C with a mean of 11.8°C. Temperature was not measured during periods of low water volume and ice cover. Upstream temperatures were usually lower than downstream temperatures. The greatest temperature difference (6°C) occurred on June 27 however, the difference between the temperature upstream and downstream was usually 2° to 3°C. Weekly in situ temperature measurements revealed normal seasonal variations. The lowest monthly mean (0.0°C) was recorded in January while the highest monthly mean (20.8°C) was recorded in July (Table 2.4-16).

Dissolved Oxygen and Oxygen Saturation

Dissolved oxygen (DO) concentrations ranged from 4.5 to 14.3 mg/l with a mean of 8.8 mg/l. Oxygen saturation ranged from 33 to 117 percent with a mean of 80 percent. DO concentrations showed a negative correlation to temperature and followed normal seasonal patterns.

Dissolved oxygen concentrations were always above the New York State standard for Class C water (trout waters, 5 mg/l oxygen; and non-trout waters 4 mg/l oxygen) for locations on Catfish Creek. The reach of Catfish Creek from Location 1 to S10 is classified as trout waters. The lowest DO recorded at Location 1 was 6.2 mg/l on August 1. The remainder of locations on the tributaries (Locations 2, 3, and S11) are classified as Class D waters. Dissolved oxygen concentrations never fell below the standard of 3 mg/l at these locations. Oxygen saturation in Catfish Creek ranged from 33 to 117 percent, with a mean of 80 percent. Throughout the year lowest oxygen saturations were present at upstream Locations 3 and S11. These low saturations were probably related to low stream flow, particularly during the summer months.

pH

The pH in Catfish Creek ranged from 5.7 to 8.9, with a mean of 7.1. The pH values recorded at downstream locations were generally higher than pH values at upstream locations. The pH at Location 1 occasionally reflected the inflow

of high pH water from Lake Ontario. Mean monthly pH values were near 7.4 through August 1977, the pH then dropped into the acidic range from September

Stream Flow

Stream flow (Table 2.4-25) at Location 9 ranges from a minimum of 0.0036 cu m/sec during September to a maximum of 1.9 cu m/sec during October. Flow rates decrease from the spring (April and May), reach low-flow state in summer (June, July, August, and September) and increase in the fall (October, November, and December). The average flow rate for the sampling period is 0.35 cu m/sec.

As stated in Section 2.3.3.2.1, total precipitation during April 1, 1977 through March 31, 1978 was considerably higher than the climatological norm. Therefore, the flows measured during 1977 may be somewhat higher than one would expect on a long term basis.

Drainage Area

The drainage area of Butterfly Creek as shown in Figure 2.4-63 is 8.9 sq mi. About 6.3 sq mi are drained above the mouth of Tributary B, which is a little below the site boundary. The basin contains 0.47 sq mi of swamp/marsh.

Gradient

Considering that portion of Butterfly Creek above the mouth of Tributary B, the average gradient is 16.4 ft/mi from 10 percent upstream to 85 percent upstream.

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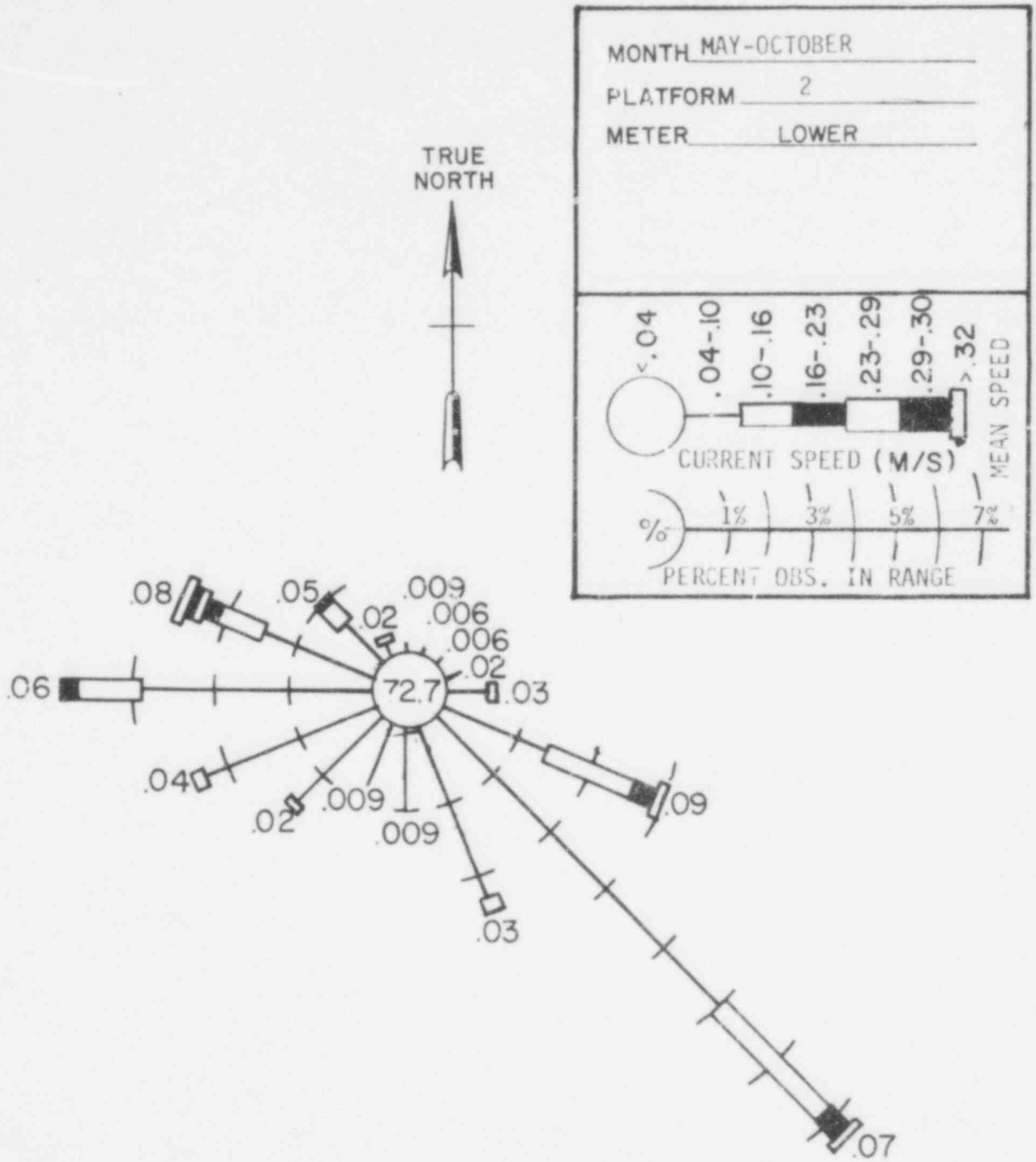


NOTE:

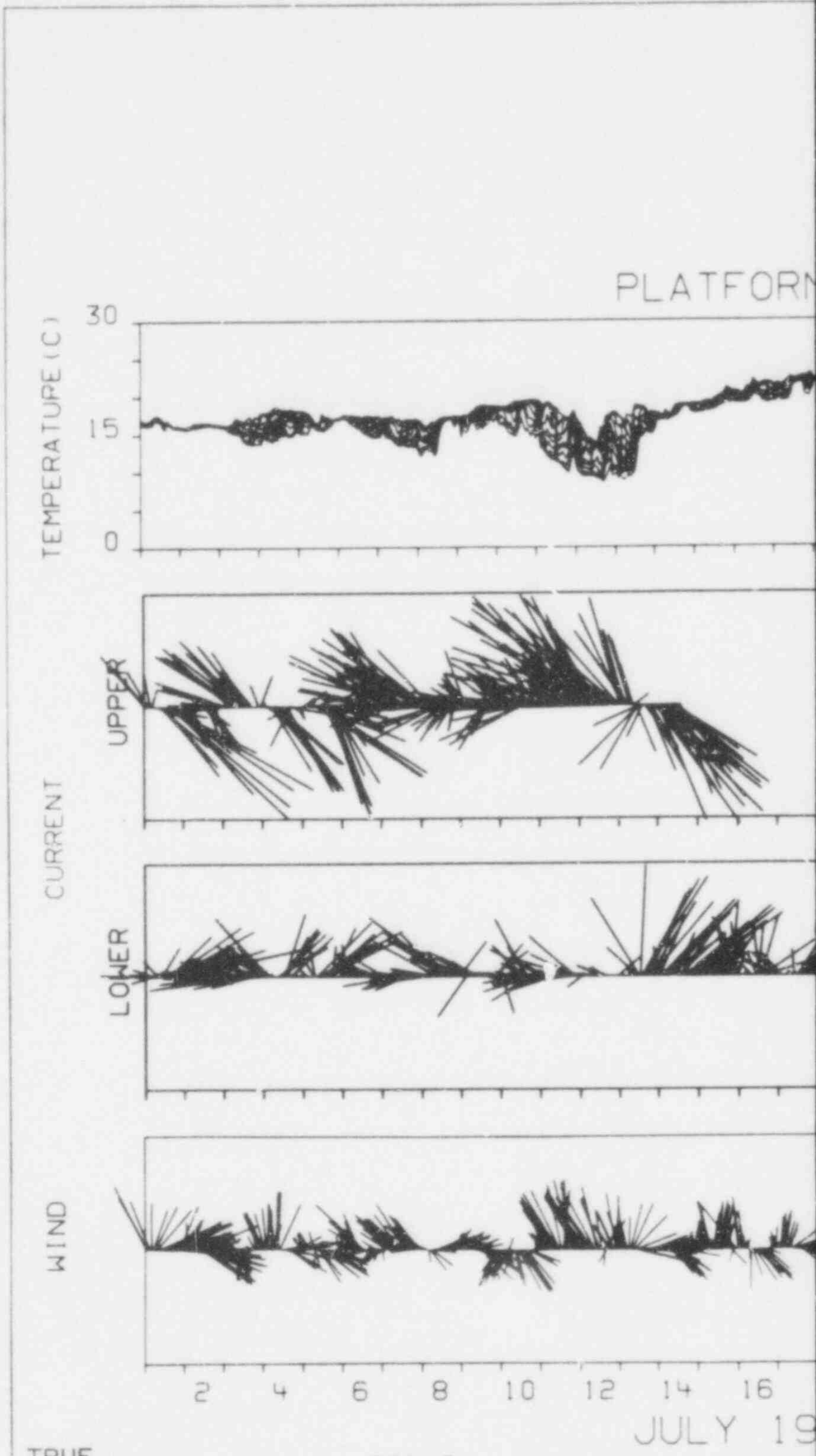
SEE FIGURE 6.1-1 FOR PLATFORM LOCATIONS

UNITED ENGINEERS & CONSTRUCTORS

FIGURE 2.4-7 NEW HAVEN SITE

ROSE DIAGRAM SUMMARIES

NEW YORK STATE ELECTRIC & GAS CORPORATION
ENVIRONMENTAL REPORT


PLATFORM
TEMPERATURE (C)
30
15
0
CURRENT
UPPER
LOWER
WIND
2
4
6
8
10
12
14
16
JULY 19
TRUE
N
SCALE
0 .1 .2 .3
M/SEC
CURRENT
0 5 10 15
M/SEC
WIND

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NOTE:

SEE FIGURE 6.1-1 FOR PLATFORM LOCATIONS

FIGURE 2.4-12 NEW HAVEN SITE

MONTHLY SUMMARY PLOTS

NEW YORK STATE ELECTRIC & GAS CORPORATION
ENVIRONMENTAL REPORT

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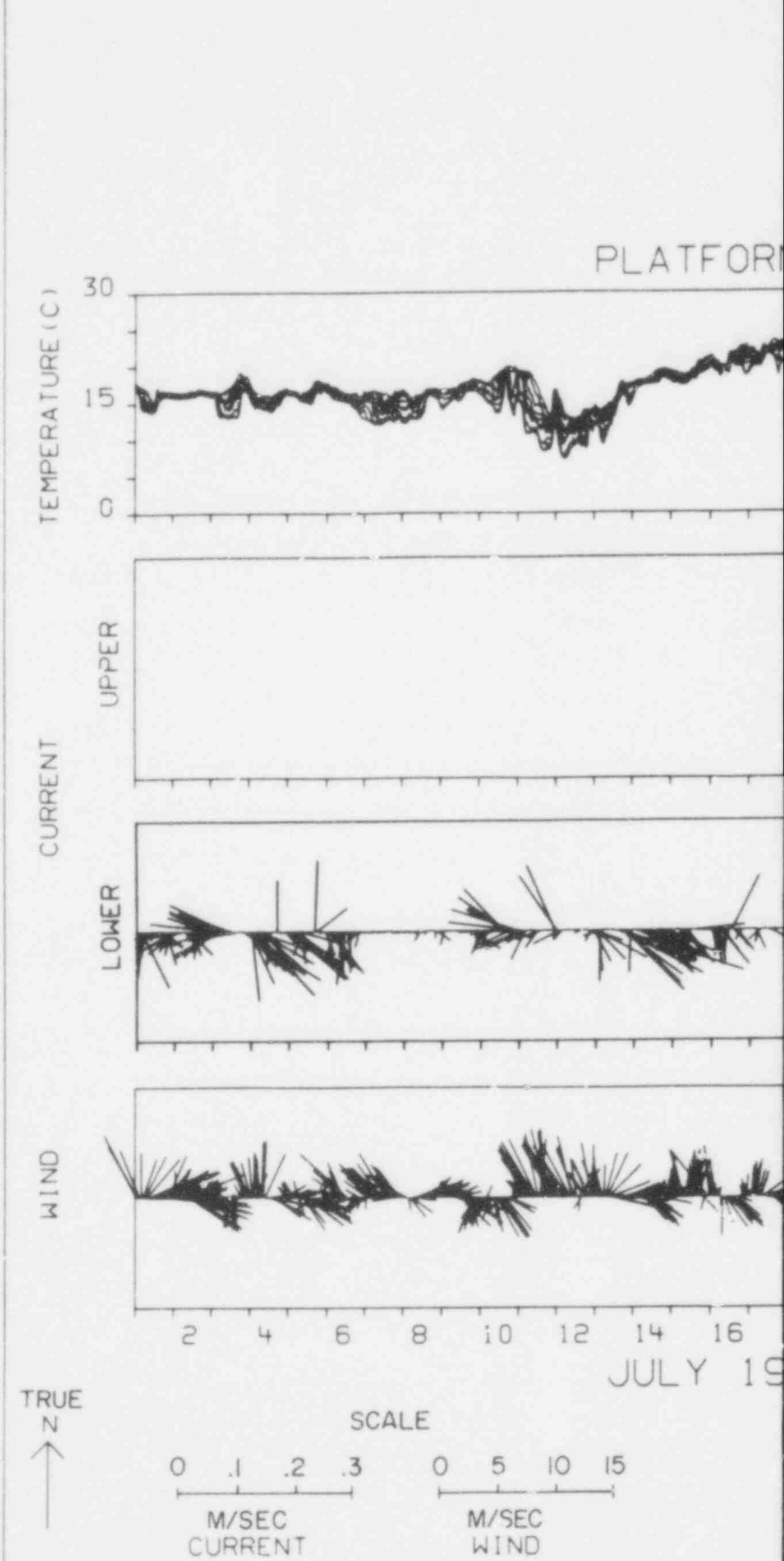
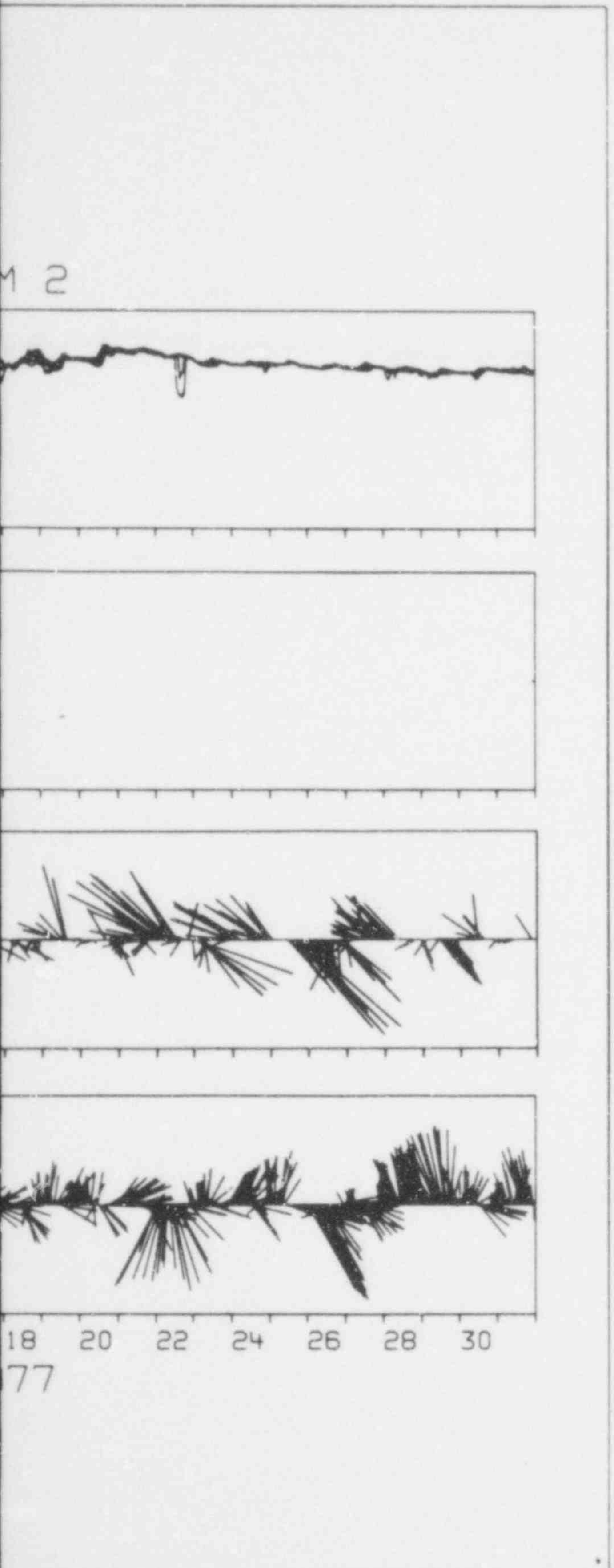


PLATFORM
TEMPERATURE (C)
30
15
0
CURRENT
UPPER
LOWER
WIND
2
4
6
8
10
12
14
16
JULY 19
TRUE N
SCALE
0 .1 .2 .3
M/SEC CURRENT
0 5 10 15
M/SEC WIND

100
565099



NOTE:

SEE FIGURE 6.1-1 FOR PLATFORM LOCATIONS

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FIGURE 2.4-13 NEW HAVEN SITE

MONTHLY SUMMARY PLOTS

NEW YORK STATE ELECTRIC & GAS CORPORATION
ENVIRONMENTAL REPORT

The field investigation located 14 archaeological sites within the limits of construction. A group of six of these sites (Site numbers 1, 2, 4, 5, and 6 in the northwest quadrant and Site number 14 in the southwest quadrant of the construction area) consist of modern (less than 50 years old) refuse dumps. These sites can be dismissed since they are too recent and without sufficient cultural importance to meet the criteria for nomination to the National Register of Historic Places and are of limited archaeological significance.

The remaining eight sites have potential archaeological significance. Two sites (Site numbers 3 and 12) are located within the northwest quadrant. Site number 3 consists of a 19- early 20th century barn foundation and covers an area 58 x 132 ft. Site number 12 is the Rome-Oswego Railroad, completed through New Haven in 1865. The line later became part of the Rome, Watertown, and Oswego Railroad and, still later, part of the New York Central system. The rail line was abandoned in 1959.

Two sites (Site numbers 10 and 13) are located within the northeast quadrant of the limits of construction. Site number 10, foundations of a 19th century farm, covers an area 200 x 200 ft and includes a barn, toolshed, ice house, milkshed, and house. A modern dump lies just behind the house and covers an area approximately 200 ft in diameter, including parts of the habitation site. Site number 13 consists of a small refuse scatter covering an area 30 x 37 ft. The material seems to date to the early 20th century.

The southeast quadrant contains two sites - Site numbers 7 and 11. Site number 7 covers an area approximately 40 x 30 ft and consists of a scatter of refuse and large stones which suggest the presence of a 19th century house foundation. Site number 11 consists of a house foundation, wells, and refuse area which has dated to the late 19- early 20th century. The site covers an area 200 x 150 ft.

Two sites (Site numbers 8 and 9) fall within the southwest quadrant. Site number 8, a barn and silo foundation, covers an area approximately 70 x 60 ft. Both were built in the late 19th century. Site number 9 consists of the foundations of a late 19- early 20th century farm complex. Included in the complex are a house, granary, ice house, milkshed, and barn.

A fieldstone obelisk found on the site is of undetermined age and significance and was partially destroyed during the 1977 hunting season.

2.6.3 Resources within 5 Miles

No structures listed on either the National Registry of National Landmarks are located within 5 mi of the site. The nearest property listed as eligible for the National Register of Historic Places is the Gustin-Earle Factory located in a 19th century industrial area, along the Little Salmon River in the Village of Mexico. This factory, located approximately 2 mi east of the site, manufactured butter dishes, animal polks, pails, and caskets in the 1870's. This site was excavated prior to construction of a sewage treatment plant and is probably no longer eligible for the National Register.

One building which is included in the state inventory of historic places, at the recommendation of the St. Lawrence-Eastern Ontario Commission, is the Shepherd-Timbello House in the Town of New Haven. Located on the northeast corner of State Route 104 and County Route 6, the house is a large rambling structure with an observation tower built in the latter half of the nineteenth century. It is, however, in a dilapidated condition. At the death of the last Shepherd family owner, the building was sold to a local philanthropist while most of the surrounding property was given to the State University Foundation Inc. After the closing of a special school housed in the structure, the interior furnishings of the building were sold at auction and the house itself is now for sale. Visitors to the location are negligible[2].

Upon request, town historians identified a few other places of local historical interest including three churches in the Town of Scriba, the grave site of Silas Towre (a revolutionary war spy for George Washington) at Mexico Point, and several residences in the Village of Mexico[3]. All of these places are of uncertain historic value and all would be between 4 and 5 mi from the proposed station. A formal opinion regarding the present condition of, and potential station impacts on, these and other historic places near the site has been requested from the New York State Division of Historic Preservation. A reply from Mr. Frederick L. Rath, Deputy Commissioner of the New York State Department of Parks and Recreation, is expected.

2.6.4 Visually Sensitive and Intensive Land Uses - Inventory

Visually sensitive and intensive land use areas within a 5-mi radius of the proposed station site are presented in Figure 2.6-1. These areas, include residential concentrations, recreational and conservation areas, historic sites and scenic areas as well as highways and roadways or rail lines through the area. The significant visually sensitive or intensive locations that exist in the area involve permanent and seasonal residences and recreational usage along Lake Ontario. There are no historic sites, national parks, or major public recreational areas and no major highway or rail corridors within 5 mi of the site.

Selkirk Shores State Park is the chief recreational attraction in the area, although it is beyond the 5-mi radius from the station. Other potential visually sensitive locations within 5 mi, such as Derby Hill bird refuge, Noyes Woods bird refuge and forest preserve, and Butterfly Swamp wetlands do not have views to the site. The representative photo locations chosen are described below. A limited number of photo locations were identified because of the low residential concentrations and limited number of public facilities within 5 mi.

Selected photo locations from representative visually sensitive and intensive areas are also shown in Figure 2.6-1. These photo locations were selected to portray the views generally afforded of the station from various locations within a 5-mi radius.

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For the site seven photograph locations were selected from which the station and associated plume would be visible. These photo locations include views from residential areas, major access roadways, and recreational sites within the 5-mi radius. In some instances locations beyond 5 mi were selected

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CHAPTER 3

THE STATION

3.1 EXTERNAL APPEARANCE OF THE STATION

Figure 3.1-1 presents the station layout and existing site topography and can be related to the station location plan presented in Figure 2.1-1. Figures 3.1-2 and 3.1-3 show the proposed finished contours and vegetative cover following construction and restoration of the site. Figure 3.1-3A shows offsite restoration in the makeup/blowdown pipeline corridor. Figures 2.1-2 and 3.1-4 show the locations of release points for liquid and gaseous wastes, and Figure 3.1-5 shows the elevations of gaseous release points. Figure 3.1-6 shows site elevation views rendered from a southeastern and southwestern direction. Figures 3.1-7 through 3.1-10 show elevation views of proposed architectural facade details. Figures 3.1-11 through 3.1-13 show architectural perspectives of the station and site area. Figure 3.1-14 presents an aerial photograph of the site area taken during a defoliate season. Figure 3.1-15 shows those site areas where major structures and excavation will be necessary during the construction of the facility.

The major station structures are located in the southwest quadrant of the site. The proposed locations of these structures were determined by several factors: Nuclear Regulatory Commission requirements, railroad access, transmission exit from the site, and minimum topographic change.

A specific objective in station location was to have Butterfly Creek remain essentially undisturbed both during construction and station operation. A natural vegetative buffer zone, large enough to avoid any sedimentation from adjacent cleared land entering the stream, will be left intact between the creek and any construction activity. The station layout also minimizes impact on the mature grove of trees located on the western portion of the site.

The major materials for station structures are concrete and metal. The reactor containment structures, annulus buildings, diesel generator buildings, service water cooling towers, diesel generator fuel oil pumphouses, heating, ventilation, and air conditioning (HVAC) buildings, and control buildings are built primarily of concrete. Other concrete structures include the natural draft cooling towers and pumphouse, and fuel buildings. The concrete is cast in place. Its exposed surfaces will be untextured, and its color is that of natural concrete.

The solid waste and decontamination buildings above grade, service building, normal switchgear buildings, administration building, makeup water pumphouse, turbine buildings, and warehouse are primarily metal clad. Transmission towers and switchyard equipment are primarily metal frame structures. Height and spacing of switchyard structures and equipment are based on the National Electric Safety Code and Northeast Power Coordinating Council design criteria and assumed equipment parameters are given in Tables 3.1-1 and 3.1-2. Table 3.1-3 lists switchyard equipment. Metal surfaces have corrosion-

resistant coatings and finish colors which are neutral or earth tones. This color scheme is compatible with the natural site environment and the station itself. Uniform surface color treatment of metal clad structures is used, where appropriate, to enhance station unity. In buildings where natural lights and views are beneficial, such as the administration buildings, windows are installed.

Tanks above ground are finish painted in colors that are compatible with the surrounding station structures.

Permanent station roads and parking areas are paved surfaces of untextured asphalt. Lane markings are painted in either yellow or white.

The site is landscaped to harmonize with the structures and natural topography. During the excavation phase of construction, existing natural features are preserved where possible.

The proposed revegetation, including ground cover and upright vegetation, is based on existing surrounding vegetation materials to re-establish the color, texture, and species composition prevalent in the area.

Existing vegetation, with crown heights above the proposed station finish grade, that is preserved during construction will restrict site views of the lower station elements along the site boundary. The most effective visual screen is located parallel to State Route 104. This screening consists of landforms built up to elevations above the station finish grade and planted with screen plantings. Where a high density visual buffer is appropriate, as in the case of nearby residences which face directly onto the site, evergreen trees are massed. Where the need for screening is less immediate, wider bands of deciduous and evergreen vegetation are planted. Both species composition and spatial arrangement are directed towards reflecting the character of this region.

Areas not planted with trees or shrubs are seeded to control erosion. Ground cover for yard areas consists of lawn or crushed stone (Figure 3.1-3).

Section 4.5.3 provides a discussion of the landscape restoration to be performed during station construction.

There are no plans for recreational, educational, or multiple use facilities on the proposed site.

TABLE 3.1-1

PRELIMINARY ESTIMATE OF HEIGHTS OF
765-KV AND 345-KV SWITCHYARD STRUCTURES ABOVE FINISH GRADE

	765 kV	345 kV
Phase conductors (ft)	120	80
Static wire (top of structure) (ft)	145	100

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TABLE 3.1-2

PRELIMINARY ESTIMATE OF CLEARANCES
BETWEEN 765-KV AND 345-KV SWITCHYARD EQUIPMENT

765-kV Switchyard		
Breaker to breaker (ft)	initial	160
	possible future	80
Breaker to transformer (ft)		260
Breaker to reactor (ft)		250
Breaker to control house (ft)		80
Between outgoing lines (minimum within switchyard) (ft)		220
Between generator breakers (minimum within switchyard) (ft)		220
345-kV Switchyard		
Breaker to breaker (ft)		25
Breaker to transformer (ft)	initial	140
	possible future	60
Between incoming lines (minimum within switchyard) (ft)		35
Between transformer breakers (minimum within switchyard) (ft)		135

TABLE 3.1-3

LIST OF EQUIPMENT
765-KV AND 345-KV SWITCHYARDS

Circuit breakers
Line reactors (765-kV switchyard only)
Transformers
Disconnecting switches
Surge arresters
Bus work
Coupling capacitor voltage transformers
Control house

3.6 CHEMICAL AND BIOCIDE WASTE SYSTEMS

3.6.1 Water Treatment Systems

3.6.1.1 Raw Water Makeup System

Water is taken directly from Lake Ontario at a constant rate of approximately 36,400 gpm. The combined two-unit circulating water system cooling towers and ultimate heat sink require 35,520 gpm and 800 gpm, respectively to replace blowdown, evaporation, and drift losses. Approximately 450 gpm are conveyed to the demineralized water makeup system when demineralized water makeup is required.

The pH of the makeup water to the natural draft cooling towers (circulating water system) is reduced to approximately 7.7 to control calcium carbonate scaling by shifting the carbonate/bicarbonate equilibrium. This is accomplished by adding an average of 27,800 lb of 93 percent H_2SO_4 per day to the makeup water before it is introduced into the circulating water system.

Raw water quality and cooling tower blowdown will be monitored periodically for pH, alkalinity, and calcium, for the purpose of controlling the calcium carbonate saturation index of the circulating water. No specific procedures have been prepared for makeup water pH sampling and monitoring.

3.6.1.2 Demineralized Water Makeup System

The demineralized water makeup system is located in the service building (building 13 of Figure 3.1-1). The demineralized water makeup system, by treatment of Lake Ontario water, provides high quality filtered and demineralized water for use in the condensate cycle and for other station uses. The system is comprised of:

1. A pretreatment process, including a raw water tank and two activated carbon filters.

2. A demineralizer process, including two cation, two anion, and two mixed-bed ion exchange units arranged in two parallel trains.

Figures 3.6-1 and 3.6-2, respectively, are schematic diagrams of the pretreatment process and the demineralizer process. During normal station operation, a carbon filter and one demineralizer train is in service, with a carbon filter and a second demineralizer train on standby or undergoing reconditioning. During peak demand periods all units can be operated simultaneously, at the design system flow rate of 450 gpm of demineralized water to the demineralized water storage tank.

Pretreatment Process

The raw water is taken from Lake Ontario and directed to a 2,000 gal raw water tank. The water is then pumped at a design flow of 225 gpm through each of two activated carbon filters to remove suspended solids and dissolved organic

compounds. The pretreated makeup water is then directed to the demineralizer process for further treatment.

When a demineralizer train is chemically regenerated (see below), the activated carbon filter serving that train is backwashed with raw water. The frequency of this operation is described in the following subsection. Approximately 3,600 gal of wastewater are produced from the backwash of an activated carbon filter. This wastewater is combined with the regeneration waste in the waste neutralizing tank. The total suspended solids concentrations (TSS) provided in Table 3.6-2 are those promulgated in 40CFR423 for low volume wastes. These allowable concentrations reflect, and are slightly higher than, the theoretical TSS concentrations obtained by dividing the total mass of suspended material removed from the raw water during the filter run, by the combined wastewater volume of the activated carbon filter backwash, and associated anion and cation demineralizer train chemical regenerant volume.

Demineralization Process

The demineralization process is divided into two trains. Each train, consisting of a cation, an anion, and a mixed bed demineralizer, has the capacity to produce 225 gpm of demineralized water.

Essentially all dissolved constituents present in the water are removed by the cation and anion demineralizers. The mixed bed demineralizers serve as polishing units to remove trace quantities of dissolved solids which may pass through the cation and anion demineralizer units.

After demineralized water passes through the mixed bed demineralizer units, it is stored in the demineralized water storage tank for subsequent use in the station.

The volumes of the demineralizer beds and the demineralized water storage tanks are:

Cation bed (2)	215 cu ft resin/bed
Anion bed (2)	172 cu ft resin/bed
Mixed bed (2)	60 cu ft resin/bed
Demineralized water storage tanks (3)	450,000 gal/tank

Resin bed volumes are based on a service run length of 20 hr at the rated capacity, and assuming a design raw water quality based on the monthly ambient water sample having the maximum total dissolved solids concentration (Refer to Appendix 2.4A, Table 2.4A-1, June 1977 data) adjusted for ion balance. Demineralized water storage tanks are designed to fulfill steam and power conversion system peak water requirements during station startup.

Makeup demineralizer system product water quality is as follows:

Parameter	Concentration
Silica	<0.02 mg/l
Sodium	<0.01 mg/l
Specific Conductance	<0.2 umhos/cm

Periodic regeneration of the cation-anion and mixed bed demineralizer units restores the resins to the hydrogen and hydroxyl forms. The regeneration wastes flow to a waste neutralization system for pH adjustment to between 6.0 and 9.0. The cation and anion exchange units are designed to be regenerated once every 20 hr during maximum conditions. It is estimated that based on average demineralized water demand each train will be regenerated approximately once every 10 days. During regeneration, each unit is first backwashed with normal influent water. The cation resins are chemically regenerated with 2 percent, 4 percent, and 6 percent solutions of sulfuric acid. The anion resins are regenerated with a 4-percent solution of sodium hydroxide. Each anion unit is rinsed with demineralized water to a low conductivity end point. Each cation unit is rinsed with filtered water. A similar procedure is used to regenerate the mixed bed units. Regeneration of the mixed bed units is estimated to occur once every 60 days. The approximate average quantities of chemicals expected to be used per month are as follows:

Sulfuric acid	6,500 lb	as	93% H_2SO_4
Sodium hydroxide	10,000 lb	as	50% NaOH

The volume of the chemical regeneration waste for a single demineralizer train is approximately 27,000 gal. Regeneration of the mixed bed demineralizer associated with the train results in approximately 2,700 gal of wastewater, included in the 27,000 gal total volume. The regeneration waste volume is not affected by run length time (i.e. frequency of regeneration). The waste neutralization system includes a 50,000 gal neutralization tank which has 1.85 times the capacity required for the neutralization volume of one complete demineralizer train. The neutralization tank is provided with pumps, pH instrumentation, and mixing equipment. The mixer will provide for uniform characteristics of the tank contents to facilitate the batch neutralization process; the mixer will operate during discharge of the neutralized waste to ensure uniform discharge characteristics. The waste neutralization system provides for continuous pH monitoring of the tank contents during neutralization and subsequent discharge. A grab sample of the discharge from each neutralized waste batch is analyzed for total suspended solids. Figure 3.6-3 shows the system, and Section 3.6.7 gives the anticipated composition and flow of neutralized wastes discharged.

3.6.2 Biocide System

Biofouling in the cooling water system is controlled by chlorination using sodium hypochlorite, which is generated onsite as needed.

Hypochlorite solution is injected into the circulating water and service water systems.

The circulating water and the turbine and reactor plant service water systems for each unit are dosed at various times. In the circulating water system, the injection points are just upstream of the inlet water box in each condenser train. In the turbine plant service water system, the hypochlorite solution is injected into the main pipeline upstream of the heat exchangers. In a similar manner, the reactor plant service water system is dosed into the line supplying the reactor plant heat exchangers at a point downstream of the reactor plant cooling tower blowdown takeoff point.

Hypochlorite addition to the circulating water system is controlled by chlorine analyzers. Each stream that is chlorinated has an automatic free available chlorine analyzer/controller located downstream of the last waterbox.

Hypochlorite addition is controlled to maintain a free available chlorine level of 0.5 ppm at the analyzer during chlorination. Automatic feedback control is performed by free chlorine analyzers.

The circulating water system and both service water systems are chlorinated twice per day for a period of 30 minutes each time. Based on the above chlorination characteristics and the EPA residual chlorine model[1], calculations indicate that both free available and total residual chlorine concentrations should comply with applicable federal effluent regulations indicated in 40CFR423. Figure 3.6-4 shows the points of injection and locations of free residual chlorine analyzers.

The sodium hypochlorite biocide system includes sodium hypochlorite generators, a sodium hypochlorite solution storage tank, a sodium chloride dissolving storage tank, hypochlorite feed pumps and distribution equipment with associated controls, and residual chlorine monitoring systems.

3.6.3 Floor and Equipment Drainage

Nonradioactive plant floor drainage and runoff from the auxiliary boiler fuel oil storage area which may contain suspended solids, oil or grease is routed through oil-water separators before it is discharged to the cooling tower blowdown. The flow rates and composition of flow and equipment drainage are intermittant and variable, since these data are dependent on daily operating conditions, potential spills, etc. The maximum flow rate from floor and equipment drainage is estimated to be less than 7,200 gpd. Oil-water separator design will be of the corrugated plate interceptor type. Capacity of the oil-water separator equipment serving the turbine buildings is approximately 75 gpm. The oil-water separator treating runoff from the auxiliary boiler fuel oil storage area will be designed to treat runoff resulting from the one in 10 yrs, 24 hr storm (i.e., approximately 7,000 gal for the area contained within the dikes.) After treatment, the composition of all floor and equipment drainage and of runoff from the auxiliary boiler fuel oil storage area will comply with the following limitations (40CFR423):

	Average	Maximum
Total suspended solids	30 mg/l	100 mg/l
Oil and grease	15 mg/l	20 mg/l

Indoor areas for bulk storage of chemicals are surrounded by curbs designed to contain the entire contents of the largest vessel within the curbed area. Chemical spills or leakage from those areas, except for storage areas in the reactor plants, are collected in transfer sumps and pumped to the waste neutralizing system described in Section 3.6.1. Reactor plant liquid waste treatment is described in Section 3.5.2. Storm runoff from chemical storage areas located outdoors, is described in Section 3.6.4.

3.6.4 Roof and Yard Drains

Roof and yard drainage is collected and conveyed to the storm drainage system. Storm drainage is conveyed offsite via drainage swales indicated in Figures 3.1-2 and 3.6-5. Figure 3.6.5 also indicates the acreage of all storm drainage areas, and specific areas for all diked chemical or oil storage. Runoff from these storage areas, except for runoff from the auxiliary boiler fuel oil storage tank, is also discharged to the storm drainage system. Treated runoff from the auxiliary fuel oil storage tank diked area, which is also shown in Figure 3.6.5, is discharged to the cooling tower blowdown as indicated in Section 3.6.3.

All chemical and above ground oil storage areas located outside of buildings are constructed on concrete pads and are surrounded by concrete spill containment dikes. The internal concrete surfaces of the sulfuric acid and sodium hypochlorite spill containments are treated with a resistant chemical coating. The diked storage areas are sized to contain the complete contents of the storage tank in addition to the runoff from the one in 10 yr, 24 hr storm of 3.7 in[2] originating within the diked area.

Runoff from the sulfuric acid storage tank diked areas and from the sodium hypochlorite storage tank diked areas is discharged to storm drainage from sumps located within the diked areas. Sumps are equipped [illegible]th level indicators and a normally close[illegible] postindicator discharge val[illegible] Prior to discharging rainfall runoff from these sumps, a pH reading wil[illegible] taken of the sump contents.

All other fuel or lubricating oil storage tanks are either located below ground, such as the two diesel generator fuel oil storage tanks and the gasoline storage tank, or are located within buildings, such as the waste lube oil storage tanks which are located in both turbine buildings.

Station and switchyard transformers and reactors are insulated and cooled by oil. The oil contained in the transformers is a mineral type, with ditertiary butyl paracresol added to extend its oxidative life. No material containing PCB's are used in any part of the station.

Runoff from switchyard surfaces other than from the immediate areas of the transformers and reactors, is collected and discharged to storm drainage as shown in Figure 3.6-5. Transformers and reactors are placed in concrete basins. A separate, underground drainage system conveys runoff which originates on the surfaces of the transformers and reactors, as well as any potential oil spillage, to collection pits constructed of concrete. The collection pits are designed to contain as a minimum, the entire oil contents of the single, largest transformer in an area, in addition to the runoff from the once in 10 yr, 24 hr storm defined previously in this section. The largest oil volume from a single transformer in the station transformer areas is approximately 36,000 gal. The oil volume of the single largest transformer in the area of the switchyards is approximately 18,500 gal. The collected storm water runoff from the transformers and reactors is treated in a corrugated plate type oil/water separator and discharged to storm drainage. Most oil spillage is cleaned up manually; any remaining oil removed from the oil/water separators, and any manually cleaned spillage would be disposed of offsite by a licensed contractor.

Monitoring of the performance of switchyard and station transformer equipment, routine onsite inspection of electrical equipment, manual cleanup of any leakage or spills associated with equipment maintenance, and the design of the drainage and treatment system for the station transformer and switchyard areas are expected to minimize, if not preclude, any oil discharges, to storm drainage. Weekly composite samples from the effluent of the oil/water separators will be analyzed for oil and grease.

The storm drainage system discharge quality will comply with the following limitations (40CFR423):

	Concentration
Total suspended solids	<50 mg/l
pH	6.0 to 9.0

3.6.5 Discharges to Land

There will be no discharges to land.

3.6.6 Discharges to Air

Water treatment chemicals introduced into the circulating water system will be discharged to the air via cooling tower drift. Drift from the proposed natural draft cooling tower system is limited to 0.002 percent of the circulating water flow rate.

Section 2.8.4 presents the chemical constituents of drift. Section 5.1 presents the magnitude and effects of salt deposition resulting from drift discharge.

3.6.7 Discharges to Water

3.6.7.1 Cooling Tower Blowdown

The evaporation of water is the main heat transfer mechanism and results in an increase of the dissolved solids concentration in the circulating water. To control the dissolved solids level in the circulating water, a portion of the circulating water is withdrawn as blowdown. The cooling tower blowdown rate varies, such that under normal operating conditions, the makeup to blowdown flow ratio results in an average concentration factor of dissolved solids of approximately 3.0. As the cooling tower evaporation varies during the year, the resulting concentration factor varies from a maximum of 6.0 to a minimum of 2.45. It is estimated that the maximum instantaneous concentration factor (as measured by mass balance of makeup flow and evaporative losses determined from hourly meteorological observations) during the data period will be equalled or exceeded for 3 hr in 10 years, based on 10 years of meteorological data from Syracuse Hancock International Airport (National Weather Service). Table 3.6-1 lists the estimated average and maximum chemical concentrations in the cooling tower blowdown. The average concentration is based on the average concentration factor and average ambient concentration of each parameter. The annual average and maximum ambient water quality is summarized in Table 3.6-6.

The maximum composition represents the estimated worst possible conditions for that particular parameter while the average composition represents the expected normal operating condition.

Both the average and the maximum concentrations for iron, chromium, and nickel include the increase in the concentrations of these metals due to corrosion in the circulating water system and the turbine plant and reactor plant service water systems.

Cooling tower blowdown complies with 40CFR423.

3.6.7.2 Neutralized Demineralizer Wastes

Neutralization is performed on a batch basis. The neutralized wastes are released at a rate of approximately 100 gpm to the cooling tower blowdown system.

Table 3.6-2 lists the expected mean and maximum chemical concentrations in the neutralized waste resulting from:

1. Carbon filter backwash and rinse
2. A cation and anion regeneration cycle
3. A cation, anion, and mixed bed regeneration cycle

The mean concentration is bas on the design regeneration cycle and the maximum concentration of each parameter, except for the trace elements which are based on average ambient concentrations. The maximum concentration is based on the design regeneration cycle and the maximum concentration of all parameters, including the trace elements. It is assumed that the effect of

carbon filter waste on the total neutralized waste is an increase of suspended solids only.

The neutralized waste complies with 40CFR423.

3.6.7.3 Chemical Additions to Plant Water

Table 3.6-3 lists all chemicals and corrosion products added to the station water. A brief description of the reasons for their use is included in the table. The table gives estimates of monthly station use, station discharge, and the frequency of use.

Table 3.6-4 shows the chemicals used for initial plant startup. The quantities of sulfuric acid and sodium hydroxide indicated in Table 3.6-4 represent the total requirement for chemically regenerating the ion exchange demineralizers for the makeup demineralizer and the condensate polishing demineralizer systems during initial startup. Of these total quantities, 15 percent are discharged from the neutralized makeup demineralizer regeneration waste. The composition of the neutralized waste is indicated in Table 3.6-2. The remaining acid and caustic quantities, as well as all other chemicals indicated in Table 3.6-4, are not discharged, but are either used in closed systems or evaporated as described in Section 3.5-2. Preoperational cleaning is described in Section 4.1.11.

3.6.7.4 Combined Waste Discharge

Cooling tower blowdown is released continuously to Lake Ontario during station operation and serves as dilution water for the release of other treated liquid wastes. The estimated average and maximum chemical concentrations of the combined waste discharge is shown in Table 3.6-5. The expected plant discharge was computed by performing a mass balance based on the flow rate and chemical composition of the blowdown and other plant liquid wastes. Corrosion products were added directly to the cooling tower blowdown.

Neutralized makeup demineralizer wastes and low level radioactive wastes were added to the cooling tower blowdown using the following relationship.

$$C = \frac{C_1Q_1 + C_2Q_2 + C_3Q_3}{Q_1 + Q_2 + Q_3} \qquad (3.6\text{-}1)$$

where:

C = concentration in plant discharge

C_1Q_1 = concentration and flow, respectively, cooling tower blowdown

C_2Q_2 = concentration and flow, respectively, makeup demineralizer regeneration waste

C_3,Q_3 = concentration and flow, respectively, low level radioactive wastes

All effluents comply with the limitations indicated in 40CFR423.

3.6.8 Ground Deposition

Section 5.1.4.2 treats the ground deposition of salts and other drift constituents.

3.6.9 Airborne

Airborne concentrations of chemicals and other constituents entrained in cooling tower drift are negligible. Drift is limited to approximately 10 gpm per unit. Section 5.1.4 presents further applicable details.

3.6.10 Reference for Section 3.6

1. National Environmental Research Center, Office of Research and Development. Predicting and Controlling Residual Chlorine in Cooling Tower Blowdown. EPA-R2-73-73-293, U.S. Environmental Protection Agency, Corvallis, Oregon, July 1973.

2. U.S. Department of Commerce. Technical Paper No. 40, Rainfall Frequency Atlas of the United States, Chart 46, 1963.

TABLE 3.6-1

ESTIMATED CHEMICAL COMPOSITION OF COOLING TOWER BLOWDOWN

Constituent	Average	Maximum*
Alkalinity, total (mg/l) as $CaCO_3$	84	86
Chlorides (mg/l)	95.5	240
Sulfate (mg/l)	254	691
Phenols(ug/l)	5.2	24
Ammonia (total) (mg/l) as N	0.06	0.24
Nitrite (mg/l) as N	0.01	0.04
Nitrate (mg/l) as N	0.55	1.96
Nitrogen (organic) (mg/l)	0.76	1.92
Orthophosphate (mg/l) as P (total)	0.013	0.078
Phosphorus (mg/l) as P (total)	0.04	0.16
Total dissolved solids (TDS) (mg/l)	607	1,360
Total suspended solids (TSS) (mg/l)	7.3	30
Silica (mg/l)	0.76	3.72
Aluminum (mg/l)	0.251	1.53
Calcium (mg/l)	114.5	258.3
Cadmium (ug/l)	0.47	3.7
Chromium (ug/l)	15.8	25.0
Copper (ug/l)	6.72	26.4
Iron (mg/l)	0.40	0.97
Lead (ug/l)	<2.9	7.8
Magnesium (mg/l)	24.2	51.6
Manganese (mg/l)	0.02	0.10
Mercury (ug/l)	<0.61	3.1
Nickel (ug/l)	<15.0	57
Potassium (mg/l)	4.09	9.60
Sodium (mg/l)	43.8	102
Zinc (ug/l)	89.1	324
pH	7.8	6.0 to 9.0
Organic carbon (total)(mg/l)	9.1	24
Fluoride (mg/l)	0.38	0.90
Cyanide (total) as $Fe(CN)_6$ (mg/l)	<0.01	<0.03
Beryllium (ug/l)	<3.2	9.0
Boron (ug/l)	102	270
Cobalt (ug/l)	<4.67	27.0
Molybdenum (ug/l)	<149	330.0
Selenium (ug/l)	<4.97	24.0
Vanadium (ug/l)	<353	1,320.0
Arsenic (ug/l)	<5.55	18.2
Iodine (mg/l)	<0.82	<5.45
Free available chlorine (mg/l)	0.2**	0.5**
Oxygen, dissolved (mg/l)	9.1	7.3 (minimum)

TABLE 3.6-1 (Cont'd)

NOTES:

* Maximum concentrations are based on maximum concentration factor and the maximum concentrations of each chemical observed in the ambient (makeup) water. Accordingly, the simultaneous occurrence of all maximum concentrations is extremely unlikely.

** Free available chlorine concentrations refer to the daily, 2-hour period (see 40CFR423). At all other times, there is no measurable discharge of chlorine.

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TABLE 3.6-3

CHEMICAL ADDITIONS TO WATER USED FOR STATION OPERATION

Chemical Used and System Involved	Reason for Use, or Source of Chemical	Estimated Monthly Quantities (lb/mo)* Addition to System Average	Addition to System Maximum	Station Discharge Average	Station Discharge Maximum	Frequency of Chemical Addition
Sodium hypochlorite (Cl_2)						
Circulating water system	Biofouling control	38,900	46,700	73	13 lb/day	Twice/day each unit
Reactor plant service water system	Biofouling control	3,400	4,100	2.4	0.4 lb/day	Twice/day each unit
Turbine plant service	Biofouling control	1,400	1,600	None	None	Twice/day each unit
Sanitary treatment facilities	Disinfection of sewage treatment plant effluent	15	38	0.04	0.1 lb/day	Continuous
Potable water system	Disinfection of potable water	2	5	None	None	Continuous
Sulfuric acid (as 100% H_2SO_4)						
Makeup water treatment system	Scaling control of circulating water system makeup water	710,700	994,000	696,200 as SO_4	973,700 as SO_4	Continuous
Demineralized water makeup treatment system	Regeneration of ion exchanges	6,000	66,000	5,900 as SO_4	64,700 as SO_4	Once every 5 days (avg) Twice per day (max)
Condensate polisher system	Regeneration of ion exchange resins	13,200	17,100	None	None	Once every 3 days
Sodium hydroxide (as 100% NaOH)						
Demineralized water makeup treatment system	Regeneration of ion exchange resins	5,000	55,000	2,900 as Na	31,600 as Na	Once every 5 days (avg) Twice per day (max)
Condensate polisher system	Regeneration of ion exchange resin	10,800	141,000	None	None	Once every 3 days

TABLE 3.6-3 (Cont'd)

Chemical Used and System Involved	Reason for Use, or Source of Chemical	Estimated Monthly Quantities (lb/mo)* Addition to System Average	Addition to System Maximum	Station Discharge Average	Station Discharge Maximum	Frequency of Chemical Addition
Boron (as B)						
Reactor coolant system	Soluble neutron absorber	20,000 lb/yr	N/A	0.86	0.17 lb/day	N/A
Chromates (as K_2CrO_4)						
Reactor plant component cooling water system	Corrosion control	80 lb/yr	N/A	None	None	N/A
Turbine plant component cooling water system	Corrosion control	365 lb/yr	N/A	None	None	N/A
Ammonia (as NH_3) (28%)						
Steam and power conversion system	Steam generator corrosion control	12,400	27,000	None	None	Continuous
Hydrazine (as N_2H_4) (35%)						
Steam and power conversion system	Feedwater train corrosion control	800	4,500	None	None	Continuous
Iron, Nickel, Chromium Oxides as Indicated						
Main cooling water system	Corrosion products from main condenser	N/A**	N/A	Cr: 22 Fe: 83 Ni: 11	N/A	N/A
Reactor plant service water service	Corrosion products from heat exchangers and service water piping	N/A	N/A	Cr: 3.3 Fe: 415 Ni: 1.7	N/A	N/A
Turbine plant service water system	Corrosion products from service water piping	N/A	N/A	Cr: 0.83 Fe: 63.6 Ni: 0.42	N/A	N/A

NOTES:

* Based on 100-percent capacity

** Not applicable

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TABLE 3.6-6

AMBIENT WATER QUALITY

Constituent (mg/l except where noted)	Average*	Maximum*
Alkalinity as $CaCO_3$	89	94
Chloride	33	40
Sulfate	29	34
Free available chlorine	ND**	ND**
Phenols (ug/l)	1.8	4.0
Ammonia N (total)	0.02	0.04
Nitrite as N	0.0036	0.0064
Nitrate as N	0.19	0.33
Nitrogen (organic) as N	0.23	0.32
Orthophosphate as P (total)	0.0045	0.013
Phosphorus as P (total)	0.015	0.026
TDS	221	243
TSS	2.5	5.0
Silica as SiO_2	0.26	0.62
Aluminum (ug/l)	86	255
Calcium	39.2	43.0
Cadmium (ug/l)	0.16	0.61
Chromium (ug/l)	1.0	2.1
Iron	0.0513	0.120
Lead (ug/l)	<1	1.3
Copper (ug/l)	2.3	4.4
Magnesium	8.3	8.6
Manganese (ug/l)	8.3	16
Mercury (ug/l)	<0.21	0.52
Nickel (ug/l)	<3.1	8.5
Potassium	1.4	1.6
Sodium	15	17
Zinc (ug/l)	31	54
pH	8.5	8.8
Organic carbon (total)	3.1	4.0
Fluoride	0.13	0.15
Cyanide (total as CN)(ug/l)	<5	<5
Beryllium (ug/l)	<1.1	1.5
Boron (ug/l)	35	45
Cobalt (ug/l)	<1.6	4.5
Molybdenum (ug/l)	<51	55
Selenium (ug/l)	<1.7	4.0
Vanadium (ug/l)	<121	220
Iodine	<0.28	<0.90
Arsenic (ug/l)	<1.9	3.0

NOTES:

* Concentrations are based on ambient water quality data obtained from station 33 (middepth and bottom)

** None detected

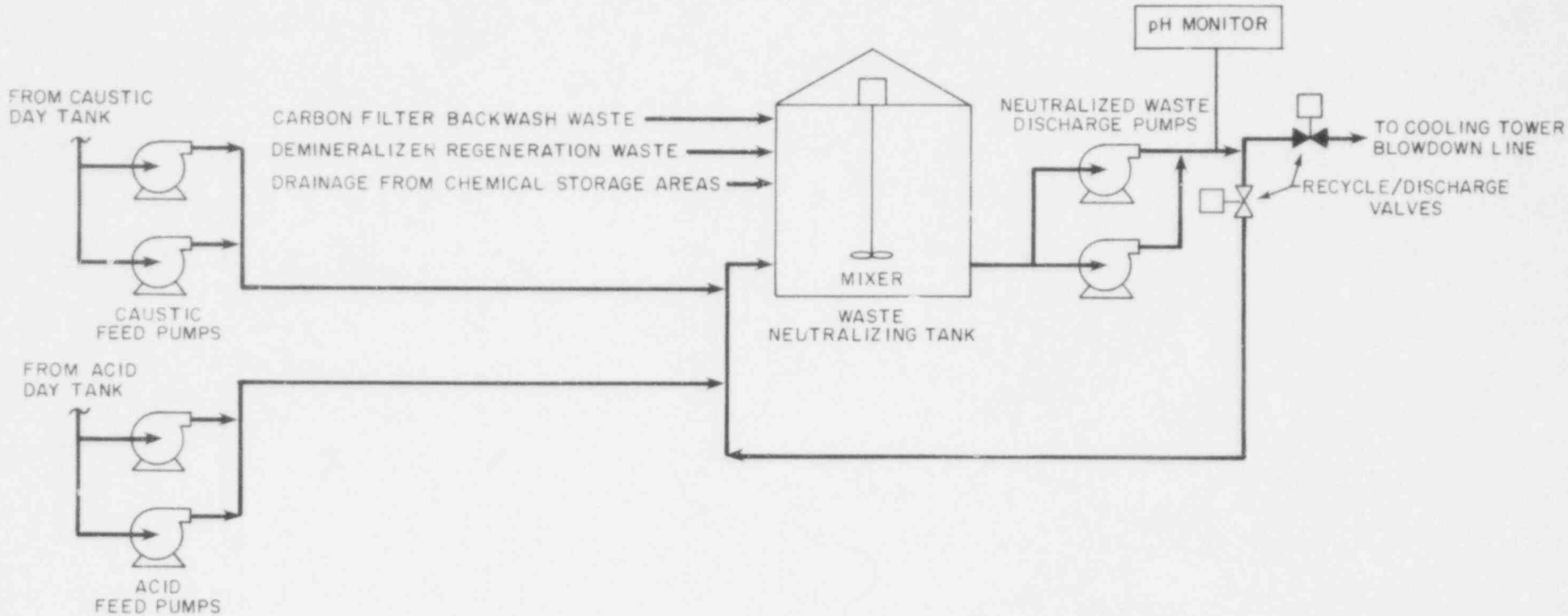
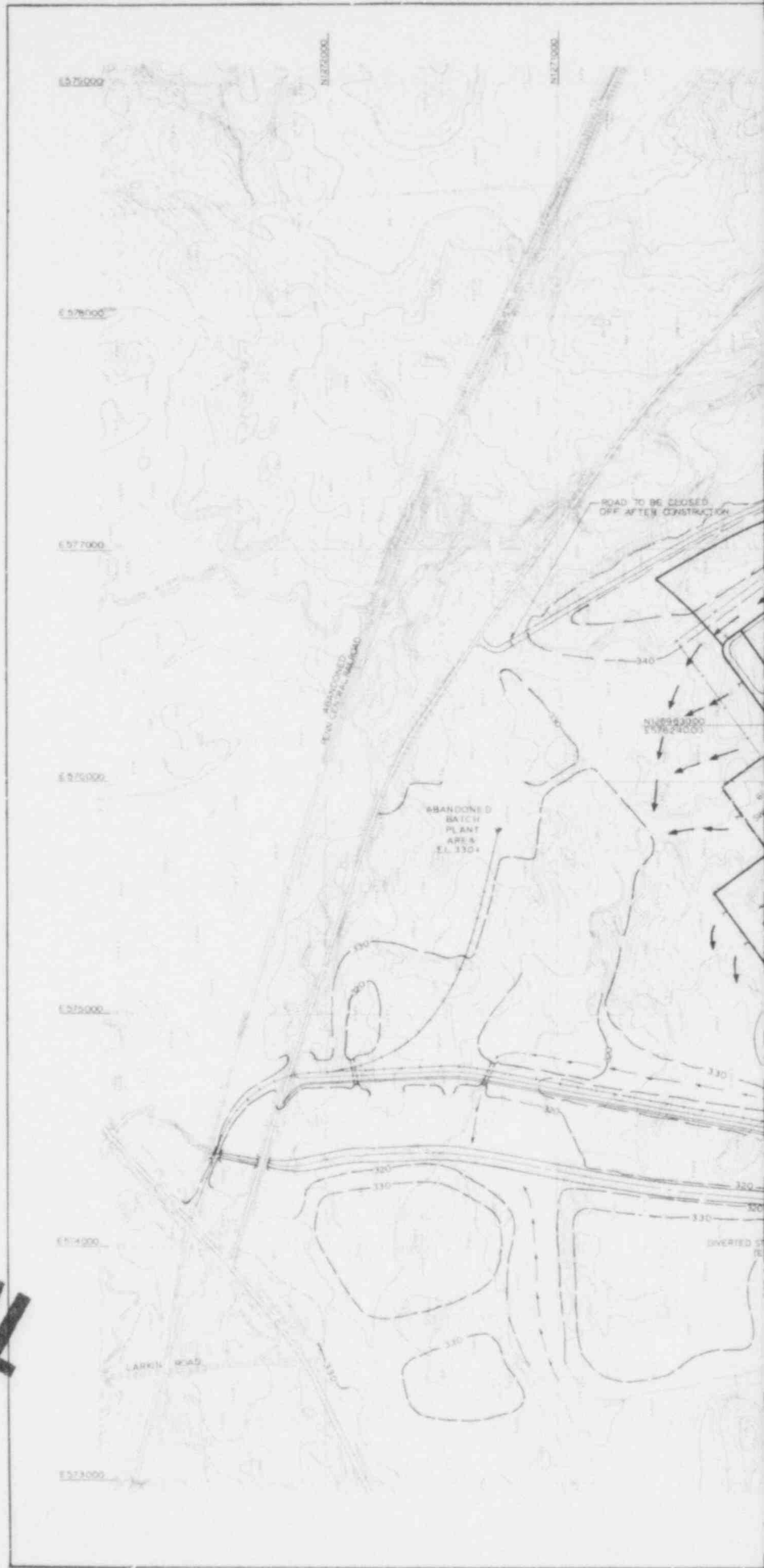


FIGURE 3.6-3 NEW HAVEN SITE

SCHEMATIC FLOW DIAGRAM
WASTE TREATMENT SYSTEM

NEW YORK STATE ELECTRIC & GAS CORPORATION
ENVIRONMENTAL REPORT



ROAD TO BE CLOSED OFF AFTER CONSTRUCTION
ABANDONED PENN CENTRAL RAILROAD
ABANDONED BATCH PLANT AREA EL 330±
LARKIN ROAD

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KEY:

DESIGNATED DRAINAGE AREAS

SYMBOL	AREA (ACRES)	SYMBOL	AREA (ACRES)
A	14.6	K	2.3
B	7.1	L	2.4
C	3.1	M	11.4
D	4.7	N	7.3
E	1.6	O	3.3
F	2.7	P	0.4
G	6.9	Q	4.6
H	2.1	R	10.4
I	1.5	S	6.9
J	2.7	T	12.9

LEGEND:

- EXST. CONTOURS
- PROPOSED CONTOURS
- SWALE OR DRAINAGE DIRECTION
- PIPE CULVERT WITH HEADWALLS
- OUTFALL

NOTES:

1. SCALE: AS SHOWN
2. GRID COORDINATES REFER TO NEW YORK STATE COORDINATE SYSTEM CENTRAL ZONE
3. ELEVATIONS REFER TO MEAN SEA LEVEL
4. TOPOGRAPHY BASED ON AERIAL SURVEY BY KUCERA & ASSOCIATES INC., MENTOR OHIO
5. REF. DWGS. EY-602A
6. EXISTING 115 KV TRANSMISSION LINE TO BE RAISED AND/OR RELOCATED ON SITE

FIGURE 3.6-5 NEW HAVEN SITE

CONCEPTUAL NORMAL ROOF AND YARD DRAINAGE PLAN

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3.7 SANITARY AND OTHER WASTE SYSTEMS

Sanitary waste water is treated in a package sewage treatment plant. During station operation, the effluent is discharged to Lake Ontario via the cooling tower blowdown line.

The sanitary waste treatment system is designed to treat the maximum flow of sewage (i.e. 90,000 gpd) which occurs during construction of the station (Section 4.1.5), as well as the sewage flows occurring during station operation.

The expected station population during normal operation is 191; during refueling the station population increases to an expected maximum of 541. Based on rates of 35 gal per capita per day of sanitary waste water and 0.085 lb of 5-day biochemical oxygen demand (BOD_5) per capita per day, the maximum daily quantity of sanitary waste water during refueling is approximately 18,900 gal which contains 46 lb of BOD_5. The average daily sanitary waste water flow is 6,700 gal which contains 16.3 lb of BOD_5. Table 3.7-1 summarizes the characteristics of sanitary waste prior to treatment.

As a minimum, the sewage treatment plant provides the following effluent quality as required by 40CFR133 and New York State Environmental Conservation Law 17-0509 for secondary treatment:

Parameter	Effluent Quality
BOD_5	30 mg/l for 30 consecutive day average 45 mg/l for 7 consecutive day average
Total Suspended Solids (TSS)	30 mg/l for 30 consecutive day average 45 mg/l for 7 consecutive day average
pH	6.0-9.0 pH units

The sewage treatment plant also satisfies the requirement to remove 85 percent of TSS and BOD_5. A schematic flow diagram of the sanitary waste treatment system is presented in Figure 3.7-1. The sewage treatment plant system uses the rotating biological contactor process. This process is a secondary biological treatment system consisting of a number of closely spaced discs mounted on a horizontal shaft. The discs are slowly rotated while partially submerged in waste water so that the biological growth on the discs is alternately submerged and aerated. Organic material in the waste water is oxidized by the growth of micro-organisms on the disc surfaces or synthesized into additional biological solids. Excess biological solids are sloughed off by the shearing force caused by disc rotation. Sloughed solids are separated from the treated waste water in a clarifier.

Waste biological solids are discharged to an aerated sludge holding tank, which provides a storage capacity of 40 days for the maximum accumulation of sludge during station refueling. The sludge holding tank provides aerobic

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digestion for the waste biological solids. Based on inspection of the accumulated sludge volume in the tank, sludge is settled and then pumped from the tank for disposal to an approved offsite location by a DEC licensed contractor. Sludge volume during normal station operation is estimated to be 1,800 gal per month based on an assumed 2 percent solids concentration.

Effluent from the sewage treatment plant is chlorinated prior to discharge to the cooling tower blowdown. The sewage treatment plant effluent complies with the following DEC guidelines (Policies and Procedures Manual, Title 9200, Chapter 9210) for fecal coliform bacteria:

200 MPN*/100 ml for 30 consecutive day geometric mean

400 MPN*/100 ml for 7 consecutive day geometric mean

*Maximum Probable Number

Table 3.7-2 provides a summary of effluent quality and quantity.

Table 3.7-3 lists the sizes of the two equalization basins, the rotating biological contactor (RBC), the two clarifiers, and the disinfection chamber. During construction, both equalization basins and clarifiers are used. The larger of the two equalization basins and the two clarifiers are disconnected for the relatively lower loadings which occur during station operation. RBC sizes are based on typical equipment manufacturer's information. The clarifier and disinfection chamber capacities are designed in accordance with the appropriate surface settling rates and detention times indicated in the "Ten-State Standards"(1). Equalization basins are designed to contain approximately two-thirds of the peak daily sewage flows during station construction and during station operation.

Effluent from the sanitary waste treatment system will be monitored as set forth by the 402 State Discharge Permit.

The station produces general refuse, which typically includes paper, metals, food waste, yard rubbish, synthetics, rags, and inerts such as glass, stone, dirt, and screen washings from the intake system. Paper is the principal component of this refuse. About once a week, general refuse is hauled from the station by a state licensed contractor to an offsite DEC approved sanitary landfill.

Reference

1. Great Lakes-Upper Mississippi River Board of State Sanitary Engineers, 1971. Recommended Standards for Sewage Works. Health Education Service, Albany, N.Y.

TABLE 3.7-1

ESTIMATED CHARACTERISTICS OF SANITARY WASTE GENERATED DURING OPERATION

Frequency*				Volume (gal)		
					Monthly	
Collection	Treatment	Transportation	Disposal	Yearly**	Max***	Avg****
C	C	P	C	3,180,000	570,000	200,000

	Concentration (mg/l)		
	Yearly	Monthly	
	Avg	Max	Avg
BOD_5	300	300	300
SS	200	300	200

	Weight (lb)		
	Yearly	Monthly	
	Avg**	Max***	Avg****
BOD_5	7,710	1,400	490
SS	5,300	950	340

NOTES:

* Key: C, continuous; P, periodic (sludge only)

** Based on each plant down for refueling 30 days/year-normal operation rest of year

*** Based on one plant refueling and one plant operational

**** Based on both plants operational

TABLE 3.7-2

PREDICTED DISCHARGE CHARACTERISTICS OF THE SANITARY SYSTEM USED DURING OPERATION

Discharge	Quantity (lb/mo) Max	Avg	Concentration[a]
Sanitary Facility[b]			
Floating and settleable solids	0	0	0
Suspended solids	140[c]	50[d]	30 mg/l for 30 consecutive day average
			45 mg/l for 7 consecutive day average
BOD_5	140[c]	50[d]	30 mg/l for 30 consecutive day average
			45 mg/l for 7 consecutive day average
Fecal coliform bacteria	NA	NA	200 mpn [f]/100 ml for 30 consecutive day geometric mean
			400 mpn [f]/100 ml for 7 consecutive day geometric mean
Chlorine	2.4[c]	0.84[d]	0.5[e]
pH	NA	NA	6 to 9

NOTES:

a. Except for pH and fecal coliform bacteria

b. Discharge will conform with federal (40CFR133) and state (NYS Environmental Conservation Law 17-0509; Chapter 9210 of the New York DEC Policies and Procedures Manual) requirements.

c. Based on one plant operational and one plant undergoing refueling

d. Based on both plants operational

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TABLE 3.7-2 (Cont'd)

e. A controlled chlorine concentration of 0.5 mg/l as Cl_2 will be maintained in the discharge for disinfection purposes. Chlorine will be introduced by the addition of sodium hypochlorite.

f. Most probable number

TABLE 3.7-3

SANITARY WASTE TREATMENT EQUIPMENT SIZES AND CAPACITIES

Equipment Item	Size or Capacity
Equalization Basins (2)*	
Volume basin A	47,000 gal
Volume basin B	13,000 gal
Rotating Biological Contactor (RBC)	
Treatment surface area	50,000 sq ft
RBC vessel volume	3,700 gal
Clarifiers (2)*	
Volume clarifier A	12,400 gal
Volume clarifier B	3,300 gal
Disinfection Chamber	
Volume	1,000 gal

NOTE:

* The total capacities of both clarifiers and equalization basins are used during station construction. Only equalization basin B and clarifier B are used for station operation.

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CHAPTER 4

ENVIRONMENTAL EFFECTS OF SITE PREPARATION, PLANT CONSTRUCTION, AND TRANSMISSION FACILITIES CONSTRUCTION

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During the first 2 years of construction, potable water will be obtained from an onsite well. A temporary treatment system is used to produce 50 gpm, net, of potable water in compliance with the maximum contaminant levels listed in subparts 5-1.61 through 5-1.65, Part 5, Title 10 of the State of New York, Official Compilation of Rules and Regulations. The treatment system will be comprised of activated carbon filtration, anion and cation exhange demineralizers, and disinfection by sodium hypochlorite. Activated carbon filter backwash and demineralizer regeneration wastes are collected in a holding sump, and are removed offsite for disposal by a licensed contractor. During peak use, the total wastewater volume from the temporary potable water treatment system used for the first 2 years of construction, is approximately 5,000 gal per day. Approximate waste composition is as follows:

Parameter	Concentration
Total dissolved solids	9,700 mg/l
Total suspended solids	30 mg/l
pH	3-11 (range, pH units)

Chemicals required for operating the water treatment system during peak demand are as follows:

Chemical	Quantity Used (lb per day)
Sulfuric acid, 93 percent	240
Sodium hydroxide, 50 percent	216
Sodium hypochlorite	0.24

Water from excavation dewatering, carbon filter backwash from potable water treatment (approximately 2 years after the start of construction), and storm water runoff will be treated for suspended solids removal in sediment detention basin No. 1 (Figure 3.1-15). Carbon filter backwash volume from the potable water treatment system will be approximately 3,200 gpd during peak use. The quality of water from excavation dewatering is expected to exhibit considerable variability, since it is dependent on many variables, including weather conditions, current work in progress, and ground water seepage.

Figures 3.1-15A and B show the location of sediment detention basin Nos. 2 and 3 which will also be used to treat stormwater runoff from other construction areas, as shown. Treatment of runoff during construction is described in Section 4.1.4.1.1.2.

Stormwater runoff outflow rates will be variable depending upon the intensity and duration of the storm.

Effluents from the sediment detention basin will comply with the guidelines expressed in New York State Department of Energy Conservation Policies and Procedures Manual Title 9100 Water Quality, Table 1 (Effluent Standards for Discharges to Intermittent Streams), with the following exceptions:

	Maximum Concentration
Suspended Solids	<50 mg/l
Settleable Solids	Not applicable
Oil	<20 mg/l

During the excavation and backfill phase, no major ground dewatering problems are anticipated. Rock removal for building foundations will be in relatively impermeable rock. The accumulation of water in the site structure excavations will result from ground water seepage through excavation walls and floors. The total seepage quantity is calculated to be about 140 gpm (Section 6.1.2.2). A value of 200 gpm is used as the maximum seasonal flow from the excavation dewatering system. This is conservative with respect to the calculated value and should accommodate any additional water inflow resulting from localized subsurface conditions. Excavation dewatering can be handled by sump pumps within the excavation. Water from the sump pumps will be discharged into sediment detention basin No. 1, Figure 3.1-15A for clarification before being discharged into the diverted stream onsite. Dewatering of structure excavations is not expected to depress the ground water levels offsite because of the impervious nature of the rock.

Waste washwater from the concrete handing equipment is treated and then reused for both washwater purposes and for dust suppression on temporary onsite haul roads and construction areas. Waste washwater flows are expected to average approximately 750 gpd, with a maximum rate of 3,000 gpd. The waste washwater will contain up to 160,000 mg/l of suspended solids[8a] consisting of sand, aggregate, and fine cement particles, and having a pH of approximately 10.0 to 12.0[8b].

Waste washwater is conveyed to a ramped sump for removal of coarse sand and aggregate. Supernutant from the sump will be conveyed to a settling basin of approximately 150,000 gal capacity. Clarified water from the settling basin will periodically be discharged to a clearwell basin of approximately 75,000 gal capacity. Water from the clearwell will be periodically pumped to the concrete handling equipment for reuse, or to sprinkling trucks. The coarse material removed by the ramped sump and settled fines in the settling basin will be periodically cleaned and disposed of onsite as landfill.

Most cements contain 90 to 95 percent of materials smaller than 74 u[8c]. The majority of these fine cement particles will deposit on the sedimentation basin and clearwell sidewalls and floor, thereby coating the interior surfaces with a thick, cementitious layer. The basin and clearwell will be excavated within a deposit of ablation till, the properties of which are discussed in Section 2.5.4.2.4. Field percolation tests within the deposit indicated an average coefficient of permeability of 10^{-4} cm/sec. It is expected that the sedimentation basin and clearwell side walls and floor will quickly become impermeable upon operation of the treatment equipment.

Portable chemical toilets will be used exclusively during the first 2 years of construction. All wastes from the portable toilets will be hauled offsite for disposal by a licensed contractor. A temporary discharge pipeline and an

onsite sewage treatment plant will be constructed during this period. When construction of the sewage treatment plant and discharge facilities are complete, treated sewage will be discharged to Lake Ontario. The sewage treatment plant will provide secondary treatment in accordance with federal (40CFR133) and state (DEC Policies and Procedures Manual, Title 9200, Chapter 9210) limitations. Maximum daily sewage loadings are expected to be 90,000 gpd and 257 lb BOD per day during peak construction activity, based on per capita rates of 20 gal/person/day and 0.057 lb BOD/person/day. Estimated characteristics of sanitary wastes are provided in Tables 4.1-1 and 4.1-2. Waste biological solids will be hauled offsite for disposal by a licensed contractor. During the peak sewage flow period, the waste biological solids production is estimated to be 880 gpd, at 2 percent solids concentration. Section 3.7 describes the sewage treatment plant process and expected effluent quality.

Used oil, hydraulic fluids, waste paint, thinners and similar materials will be collected and periodically transported offsite for reclamation or disposal by a licensed contractor.

4.1.1.7 <u>Chemical Spills During Construction</u>

During construction, storage of lubricants, oils, and chemicals above ground will be within enclosed facilities as noted in Table 4.1-16. Storage areas within these facilities, except small containerized storage within enclosed trailers, will be on a concrete pad with concrete spill containment curbs. The volume contained by the curbed area will be at least equal to the volume of the single largest vessel stored in the curbed area. Any spillage within these dikes will be reclaimed or disposed of offsite. Offsite disposal will be performed only be contractors licensed by the State of New York.

Fuel for construction vehicles will be stored onsite in buried tanks. Fuel will be dispensed from these tanks by conventional service station pumps to mobile tank trucks which will service the construction equipment. Surface spillage of fuel would be contained at the point of spillage and cleaned up manually. Underground spills, which would affect a small area, would be cleaned up by excavating the contaminated soil and backfilling with clean materials. Excavated materials would be disposed of in a DEC approved landfill. Expected storage locations for construction lubricants, oils, and chemicals are shown in Figure 4.1-13.

4.1.1.8 <u>Excavation and Land Filling</u>

Clearing operations (intermittently) are the first activity at the site and are completed in approximately 9 months. Marketable timber will be harvested and sold if buyers can be found. Other timber and brush will be chipped and mulched, or burned onsite.

Several control measures are planned and implemented during construction to reduce soil erosion and sediment runoff. These measures include mulching, seeding, or stabilizing exposed areas with crushed stone, pavement, and other

effective cover materials, installing sediment basins, and constructing diversion ditches to control surface runoff.

As soon as clearing is sufficiently advanced, and an erosion control plan implemented, excavation for plant structures begins. Approximately 3,300,000 cu yd of soil and 500,000 cu yd of rock are excavated. This material is used for leveling the site, backfill above foundation grades, site roads and railbed, switchyard, landscaped landforms, and as fill in low areas of the site. Approximately 300,000 cu yd of select granular material for use as structural fill is obtained from borrow pits located on or offsite (refer to Section 2.5).

Standard heavy earth-moving equipment is used for overburden excavation operation. Sprinkler trucks provide dust control during this phase and, as necessary, throughout the construction program.

The use of explosives during construction conforms to Occupational Safety and Health Administration and local regulations. A licensed blasting specialist designs the project blasting plan and the individual blasts. Blasts are matted where possible to minimize fly rock and dust.

4.1.1.9 <u>Construction in Adjacent Water Bodies</u>

The construction of the temporary intake and discharge as shown in Figure 3.4-4 will consist of:

1. Trenching onshore and lake bottom
2. Installation and backfilling of pipelines
3. Installation of armor stone on top of trench for protection against ice damage.

Maximum size anticipated for each temporary pipeline is 12-inch outside diameter.

The trench for the temporary intake and discharge pipelines extending into Lake Ontario will be excavated with a dragline. The subaqueous segment of the trench will be approximately 2,000 ft long, 4 ft deep, and 4 ft wide. Approximately 1,200 cu yd of lake bottom material, consisting primarily of gravelly sands and silty sands, will be locally displaced to the sides of the trench rather than removed and stored. Following installation of the pipelines, the trench will be backfilled with clean sand and capped with armor stone.

Shoreline excavation to the pumphouse area will be done with a backhoe. The material excavated for the trench will be used as backfill after installation of the pipelines. Armor stone will be placed over the backfill, from the shoreline to the pumphouse area, for protection against ice damage.

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The construction of the temporary intake and discharge pipelines, from the pumphouse area out into Lake Ontario, will take approximately 6 weeks to complete.

The makeup/blowdown systems, from the makeup water pumphouse on shore to the intake/discharge structure in Lake Ontario, consists of:

1. Rock tunneling below the lake bottom

2. Installation of multiple port discharge structures, and

3. Installation of an inlet structure

The discharge structures will be prefabricated on shore, barged out, sunk and set in place in predrilled vertical shafts at specific locations along the rock tunnel route. The vertical shafts will be drilled in the wet utilizing a mobile, self-elevating construction platform. Lake bottom activities anticipated to construct each discharge structure include local removal of overburden and placement of a tremie concrete seal mat prior to drilling the vertical shafts for the discharge structure risers. After the steel pipe discharge structures are set in the vertical shafts and grouted in place, the risers will be encased in concrete using the tremie method and sheet metal forms.

The inlet structure, with an attached temporary steel caisson, will be prefabricated on a barge, barged out, sunk, and set in place on a prepared tremie concrete seal mat at its designated location. Lake bottom activities anticipated to construct the inlet structure include local removal of overburden and placement of a tremie concrete seal mat prior to sinking the inlet structure in place. Installation of rock anchors on the lake bottom is also anticipated for use in stabilizing the attached steel caisson. Drilling of the vertical shaft to connect the inlet structure with the rock tunnel will be done in the dry after dewatering the caisson and sealed inlet structure. After construction of the inlet structure, the caisson will be removed.

The makeup and blowdown pipe line will cross the tributary to Catfish Creek in two locations. Prior to crossing the tributary, that portion of the stream to be crossed will be temporarily diverted. The temporary diversion channel will be excavated and stabilized with jute mesh, sod, or other suitable materials. Flow diversion will be accomplished by blocking the existing stream channel with sandbags or other suitable dike material adjacent to the diversion inlet and outlet locations. Following installation of the makeup/blowdown pipelines at the stream crossing, the stream bed and embankments will be restored and stabilized with gravel, rock, mulch, and seed or other suitable materials. Upon completion of stream bed stabilization, flow will be restored to the stream and the diversion channel will be backfilled and regraded.

The temporary diversion, in each location, will effect approximately 100 ft of existing stream bed and will require approximately 3 weeks to complete.

4.1.1.10 Water Use

Construction water requirements include water for dust control, building services, concrete production, soil compaction, fire protection, and domestic purposes. Construction water demand will be a maximum of approximately 250 gpm and will be primarily used for drinking water, sanitary water supply, and concrete production. During the first 2 years of construction, a lesser quantity (about 50 gpm) of water is required and this water will be drawn from wells onsite and processed through a package treatment facility to meet the New York State drinking water standards for community water supplies. After construction of a temporary intake and pump system has been completed, the balance of construction water will be obtained from Lake Ontario. Potable water, taken from wells and Lake Ontario, will be treated by the package system using filtration by activated carbon, followed by disinfection by sodium hypochlorite.

Permanent fire protection storage tanks and yard fire protection will be established as soon as excavation and backfill operations permit, and will be maintained for use during the remainder of the construction program. Makeup for this system will be from the construction water system until the permanent plant makeup water intake structure and associated systems are complete.

4.1.1.11 Preoperational Cleaning and Testing

Subsequent to installation and prior to operation, all reactor plant and turbine plant systems are cleaned by flushing with the fluid normally in the system (i.e., water is used in water systems and air is used in air systems). Closed-loop water systems will be flushed with demineralized water by recirculating this water throughout the system. Temporary filters and/or strainers will be used to verify system cleanness meeting the requirements of ANSI N45.2.1 (1973), and to prevent either the potential discharge to receiving water, or recirculation of foreign matter. Systems such as the circulating water system and the reactor plant service water system will use raw water and the recirculation technique for flushing. The total quantity of water will be minimized by the recirculation technique, such that the estimated quantity of spent flush water (i.e., demineralized and raw water) finally discharged to Lake Ontario will be approximately 5,000,000 gal.

Cleanness control, through the use of industry standards such as ANSI N45.2.1, N45.2.2, and N45.2.3, ensures a high degree of cleanness in the various piping systems during manufacture, shipment, onsite storage, and installation. Accordingly, the preoperational water flush will not remove any significant quantities of foreign matter.

Sulfuric acid and sodium hydroxide quantities required to chemically regenerate the makeup demineralizers, were conservatively estimated by assuming that the total flush water requirement of 5,000,000 gal are of demineralized water quality. The total quantity of the demineralizer regeneration waste is approximately 0.5 million gallons. The total quantities of 93-percent sulfuric acid and 100-percent sodium hydroxide required to

regenerate the demineralizers during the production of 5,000,000 gal of demineralized water, are 25,500 lb and 19,200 lb, respectively.

The pH of the demineralizer regeneration waste is adjusted to within 6.0 to 9.0 by the waste neutralizing system (refer to Section 3.6.1.2, New Haven-Nuclear, Amendment 3). The composition of the neutralized demineralizer regeneration waste is indicated in Table 3.6-2. Due to the various cleanness control procedures described above, the use of temporary strainers and filters, and the use of demineralized water or raw water where appropriate, the composition of the spent flush water is expected to comply with the following discharge criteria indicated in 40CFR423 for metal cleaning waste, without treatment:

Parameter	Daily Maximum Concentration	Average 30 Day Concentration
Total suspended solids (TSS)	100 mg/l	30 mg/l
Oil and grease	20 mg/l	15 mg/l
Copper, total	1.0 mg/l	1.0 mg/l
Iron, total	1.0 mg/l	1.0 mg/l

Spent or recirculating flush water stored in two of the demineralized water storage tanks will be discharged to Lake Ontario along with neutralized regeneration waste via the permanent cooling tower blowdown.

Preoperational flushing will occur over an approximate nine month period. Discharges from these operations will be intermittent. It is not possible to accurately predict the wastewater discharge frequency; however, maximum discharge flows for spent flushwater and neutralized demineralizer regeneration waste are 300 gpm and 100 gpm, respectively.

The neutralized demineralizer regeneration waste will be monitored for pH and TSS as described in Section 3.6.1.2, New Haven-Nuclear, Amendment 3. Spent flushwater will be periodically monitored for TSS and iron.

The treatment and discharge of floor and equipment drainage, which may result in part from infrequent floor rinsing, are described in Section 3.6.3, New Haven-Nuclear, Amendment 3. There are no other planned or expected cleaning operations resulting in the discharge of waste waters.

4.1.2 Land Use and Environmental Impacts of Site Preparation and Station Construction

4.1.2.1 Disruption of Site Area Land Uses

Onsite land uses are agricultural, commercial, and residential with areas of woodlands and shrublands, as described in Section 2.1.3.1. The impact of the

station upon onsite agricultural and commercial uses is discussed below. Impacts on residents are discussed in Section 4.1.2.2.

Prior to the construction of the proposed station, NYSE&G will negotiate for the purchase of the properties within the site boundaries for considerations which are commensurate with the fair market value of the properties. In its negotiations, NYSE&G will consider the reasonable costs of relocation for owners residing on the property. In assessing the impacts of the acquisition

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incidentally or during migrational periods. Thus, the impact of the proposed station on these nine species should be minimal. The remaining four species were permanent or summer residents which nested on the site. Even though the habitats used by these birds will not be eliminated by the proposed project, any reduction in habitat will mean displacement of individuals. A brief discussion of the probable impact on each species is presented below.

A pair of American kestrel were regularly observed in the swamp cover type just south of the abandoned railroad grade. The birds apparently nested in a cavity in one of the many dead trees present in this area. This specific area will not be eliminated if the facility is constructed. The dead trees containing the cavities, however, will probably not remain standing for more than another decade (they will eventually decay or fall). The American kestrel typically feeds in open fields, frequently perching on transmission lines. The eventual disappearance of open fields on the site through the process of floral succession will eliminate most of the onsite open field habitat. This open habitat is common in the site region, and the impact of station construction on the American kestrel is considered insignificant. The American kestrel has been placed on the Blue List because of declines in its population primarily in Florida and the Gulf States[24].

Five red-headed woodpeckers were regularly observed in the same area as the American kestrels. The red-headed woodpecker is apparently uncommon in Oswego County[28], and concern for it is widespread[27]. This woodpecker breeds in river bottoms, near beaver ponds, in open wooded swamps where dead trees and stumps are plentiful, in open savanna-like country with extensive grassland and scattered trees, and in cleared upland areas[29]. Bull[29] indicates that in addition to habitat reduction, roadside mortality and usurpation of nest holes by starlings may contribute to the recent decline of the red-headed woodpecker. The construction of the station will not eliminate the area where the red-headed woodpecker is currently found. The long term onsite presence of the red-headed woodpecker is, however, in doubt because many of the dead trees in which it might be nesting are likely to decay or fall within the next decade. However, there are other similar dead trees in the vicinity of the site which might be used, particularly near Butterfly Swamp.

Hairy woodpeckers were regularly observed during all seasons. Ornithologists are primarily concerned about this woodpecker's population trend in Florida, the Southern Great Plains, and South Texas, where populations appear to be declining[27]. Hairy woodpeckers nest in dead trees, usually in extensive tracts of forest where large trees, dead stubs, and fallen logs are abundant[29]. Even though the woodlands onsite are not extensive, this species was regularly observed in all seasons. Although its total numbers are certain to be reduced as a result of clearing of woodlands, the occurrence of extensive woodlands in the region should make the impact of station construction minimal.

The yellow warbler was extremely abundant onsite from spring to fall. Concern for this species is varied; some ornithologists believe that continent-wide population is declining[27]. The species is an adaptable breeder and nests in garden shrubbery, bushes, trees, and dense thickets[29]. The clearing of

onsite shrub communities is expected to reduce temporarily the number of yellow warblers nesting onsite. The effect of this impact is expected to be negligible, however, because of the large amount of shrub habitat available in the site region. The development of shrub communities that will begin when farming activities end will increase the onsite nesting habitat for yellow warbler within 5 to 10 years after construction begins.

4.1.3.4.9 Effects on Recreationally Important Species

Of the three species of upland gamebirds inhabiting the site, the woodcock and ruffed grouse will be most significantly affected. The existing shrub and second growth woodlands onsite provide excellent habitat for both. The loss of the onsite woodland and shrub communities will temporarily reduce this habitat. This loss will be compensated for by the development of similar communities on undisturbed portions of the site. The effect will not be significant from a regional perspective because the region includes a large amount of this habitat. The ring-necked pheasant, the third upland species, is not abundant onsite or in the region of the site, even though considerable habitat in the form of old fields and agricultural fields is available. The cessation of farming activities will completely eliminate the onsite habitat for the pheasant, because fields will be replaced by shrub communities. Because the pheasant populations in the site region are low, no significant effect on the total pheasant population is expected.

Because the area of wetland habitat onsite is relatively small (less than 10 acres), the occurrence of waterfowl onsite is primarily incidental. No significant effect is expected.

The eastern cottontail is the most abundant game mammal onsite. A mixture of cropland, grassland, brushland, and cut-over woodlands is ideal habitat[30]. Clearing such areas on the site will reduce the onsite habitat for the eastern cottontail and reduce the total onsite population. However, this reduction may be mitigated to some degree by later restoration of temporarily disturbed areas. The effect on the abundance of the eastern cottontail in the site area should be negligible, however, because much of the surrounding land is a similar mixture of cropland, grassland, brushland, and cut-over woodlands.

The gray squirrel and white-tailed deer also occur on the site. Clearing vegetation will reduce the habitat available for these species; however, because their numbers on the site are low, the reduction of available habitat is expected to have a minimal effect on the populations of these species in the vicinity of the site.

Trapping is conducted onsite for several mammal species (Section 2.2.1.6). Muskrat, raccoon, and mink have been taken along Butterfly and Catfish Creeks. The relocation of a tributary of Catfish Creek will reduce the habitat available for these species. The onsite populations of these mammals appear to be low; few were trapped along the portion of the streams to be affected. Therefore, the impact on the local regional population is not expected to be significant. The site will be permanently closed to hunting and trapping when station construction begins.

expected to remain essentially unchanged from that which exists in the natural habitat.

Construction of the stream diversion is described further in Section 4.1.4.1.1.2 as part of the conceptual erosion and sedimentation control plans. Construction of the stream diversion will take place in three phases which will facilitate implementing various erosion and sedimentation control measures. Measures which will minimize turbidity in the portion of Catfish Creek, downstream of the diversion include the following:

1. For each portion of the stream diversion completed during each phase of construction, the diversion channel and side slopes will be stabilized as soon as possible after excavation and grading.

2. Where possible, all discharges resulting from runoff from construction areas are discharged to the Catfish Creek tributary either downstream of any portion of the diversion under construction, or are discharged to stabilized portions of the diversion.

3. Three sediment detention basins will be used, and temporary protective measures such as straw bales or filter berms will be employed to minimize the introduction of sediment-laden storm water to the diversion channel.

The aquatic impact associated with this type of a stream diversion will be minimal. Loss of the original stream bed through diversion of the Catfish Creek tributary will not result in any unique habitat or species losses for fish or benthic macroinvertebrates. Organisms encountered in the stream sections to be rerouted were also present upstream of these areas. Therefore, they will be available to colonize the new stream bed. Sport fish were not encountered in any of the areas to be diverted.

The effect of stream diversion on water quality will be exhibited directly as changes in concentrations of total suspended solids released during construction and temperature changes induced by changes in vegetative cover or stream depth and width. Because of the shallowness of the stream and the aeration, temperature changes would not have an effect on dissolved oxygen concentrations. Therefore, this alteration should not stress the biological community.

Turbidity levels associated with stream diversion are difficult to predict because of the many variables existing at the time of the actual diversion. The effect of turbidity on aquatic biota downstream from the diversion is minimal because of its short duration.

The permanent loss of approximately 1,200 ft of the intermittent tributary to Catfish Creek will not seriously impact the aquatic ecosystem. The existing stream course of the Catfish Creek tributaries and the diversion channel are delineated in Figures 3.1-15 and 3.1-15A. These streams have been designated as Class D waters[30a]. The NYSDEC Policy and Procedures Manual[30b] defines all Class D streams as intermittent. Field observations at sampling locations

S11 and 3 also provided evidence for zero flow conditions (Appendix Table 2.4A-10). The tributaries of Catfish Creek are common from the standpoint of biotic resources in the area and are not used for spawning by migrant species of fish from Lake Ontario. The mill dam on Catfish Creek at North Road is an effective barrier to fish movement from that point.

No onsite permanent diversion of the west branch of the Catfish Creek tributary will be necessary. The stream bed of this intermittent stream in the vicinity of the top soil storage and spoils area (Refer to Figure 3.1-15A) will require restoration at its entrance to the diverted stream channel and at the makeup/blowdown pipeline crossing. Temporary diversion of stream flow is required to perform this work. The temporary channel will be stablized with jute mesh or sodding. The restored portions of the stream bed and embankments will be stabilized with seeding, gravel or stone prior to restoring flow through the stream.

The construction of the makeup and blowdown line will require two crossings of the Catfish Creek tributary as described in Section 4.1.1.9. Aquatic impact relative to these diversions will be both short-term and reversible due to the relatively small portions of existing stream bed to be disturbed and the short duration of the diversions. Impact will, therefore, be confined to the loss of a small portion of the existing stream benthic habitat and a very short period of elevated levels of suspended solids due to construction activity. Once the stream course is restored, recolonization of the disturbed bottom will renew the benthic population lost during the diversion.

4.1.4.1.1.2 Site Runoff

The conceptual runoff and erosion control program will be implemented in three phases which are outlined below. Areas of construction associated with each phase, the locations of sediment detention basins No. 1, 2, and 3, and runoff routes are shown in Figures 3.1-15, 3.1-15A, and 3.1-15B. Each phase of the program is designed to isolate runoff in the main site work areas and to collect and convey potentially contaminated runoff from these areas to sediment control facilities. Runoff from undisturbed portions of the site will, where feasible, be diverted away from site construction areas.

The design stormwater runoff volumes which discharge to sediment detention basins No. 1, 2, and 3, from the one in 10-yr, 24-hr storm, are 23.1, 23.1, and 8.4 acre-ft, respectively. These volumes were determined based on the respective drainage areas shown in Figures 3.1-15 and 3.1-15A, a one in 10-yr, 24-hr storm of 3.7 in,[33] and a runoff coefficient of 0.5.[34] The sediment detention basins are designed and maintained to contain the entire quantity of water from this design runoff event. Outfall design will either be of the perforated riser pipe type, or will utilize a rectangular weir overflow. Detention times will be variable since they are dependent on a number of factors including rainfall intensity. Sediment detention basin design will incorporate the recommendations of the State of New York,[35] and the EPA.[36] The design of the sediment detention basins, which is in compliance with 40CFR423, and the conceptual runoff and erosion control design described below, utilize the best available technology to minimize erosion and control

sedimentation. These designs and procedures are consistent with a sediment detention basin effluent total suspended solids concentration of 50 mg/l.

Phase I

Major construction activities associated with Phase I are shown in Figure 3.1-15A. The construction activities for which the Phase I program is designed include construction of temporary access roads, general site grading in the power block, batch plant, laydown and 345 kV switchyard areas, and related filling and topsoil stockpiling to dispose of excavated materials. The onsite portion of existing Catfish Creek tributary will be temporarily relocated along the alignment of the main entrance road, and the northernmost portion of the permanent diversion channel for Catfish Creek tributary will be excavated and stabilized. During Phase I, the flow from the tributary will be diverted into this section of the permanent diversion channel. Measures that will be taken to control runoff and erosion from these operations are described below.

Runoff from Area A will be directed to sediment detention basin No. 1. This has a minimum capacity of approximately 23.1 acre-ft. Water is discharged from the basin into the temporary channel of Catfish Creek tributary.

In Area B, straw bales, filter berms, or the equivalent will be provided around those sections where runoff will originate. These temporary protective measures will be maintained until vegetative cover has been established. A portion of this runoff will be discharged to Catfish Creek, and the remainder will be conveyed over natural drainage contours to Butterfly Creek.

Area C will be graded toward sediment detention basin No. 2. This excavated basin has a minimum capacity of approximately 23.1 acre-ft. Water from this basin discharges into the temporary channel of Catfish Creek tributary.

Area D will be graded to drain west to the permanent diversion channel of Catfish Creek tributary. Straw bales, filter berms, or the equivalent will be provided across the path of runoff from this area and will be maintained until vegetative cover has been established.

Area E is graded to conduct potentially contaminated runoff to sediment detention basin No. 3. This basin is formed by excavation within a horseshoe - shaped dike, and has a minimum capacity of approximately 8.4 acre-ft. Water is discharged from the basin into the permanent diversion channel for Catfish Creek tributary.

At Area F, straw bales, filter berms, or the equivalent will be placed across the path of runoff from the topsoil piles. The water is discharged into the permanent division channel for Catfish Creek tributary. These temporary protective measures will be maintained until vegetative cover has been established in this area.

Phase II

The major construction activities associated with Phase II are shown in Figure 3.1-15B. The construction activities for which the Phase II program is designed include construction of the 765 kV switchyard and most of the permanent diversion channel for Catfish Creek tributary. Excavated materials will be placed in topsoil storage, spoils, and landscaped landform areas indicated in Figure 3.1-15B. Vegetative cover will be established in these areas as soon as possible.

The Phase I erosion and sedimentation control measures will continue in effect, with the following additions. Sediment detention basins Nos. 2 and 3 will be maintained during excavation of sections of the permanent diversion channel upstream from these basins. Channel excavation will proceed in the upstream direction. This increases the capacity of sediment detention basins Nos. 2 and 3, and directs runoff from the channel excavation to these basins. The channel will be stabilized as excavation proceeds upstream, and the slopes above the channel will be topsoiled and seeded. Area C is extended to include all of the 765 kV switchyard and the landscaped landform areas surrounding the switchyards. Straw bales, filter berms, or the equivalent will be placed across the path of runoff from the areas affected by excavation and fill placement. Runoff from the 765 kV switchyard, and from the northern slopes of the adjacent landscaped landform areas, flows to sediment detention basin No. 2. Runoff from the southern slope of these areas flows into the temporary channel of the Catfish Creek tributary.

Phase III

Figure 3.1-15 shows the major construction activities near the end of Phase III. The Phase III erosion and sedimentation control program completes the permanent diversion channel for Catfish Creek tributary, and transfers the tributary's flow into the permanent channel. To accomplish this, the sediment in sediment detention basin No. 3 is removed to a spoils area. The basin dike is also removed, and this section of the permanent diversion channel is graded and stabilized. The channel section at sediment detention basin No. 2 is then completed in a similar manner. After these sections of the permanent diversion channel have been completed, the temporary Catfish Creek tributary is diverted into the permanent channel.

During Phase III, some additional fill will be placed in the spoil and landscaped landform areas. Temporary protective measures such as straw bales or filter berms will be placed across runoff flow paths from these areas.

Increased siltation, caused by higher levels of total suspended solids in site runoff, could affect aquatic organisms. Site runoff from disturbed areas will be treated in onsite sediment detention basins (Section 4.1.1) to remove suspended solids before the runoff enters the diverted stream. Suspended solids in the effluent from the basins are not expected to exceed 50 mg/l (Section 4.1.1.6). Onsite organisms or downstream communities will not be affected by increases in suspended solids, because only minor increases in ambient concentrations are expected.

Maximum suspended solids concentrations of 43 mg/l were recorded in Catfish Creek during 1977. These data indicate that natural stream concentrations were near the maximum discharge concentration of 50 mg/l at certain times of the year.

Table 4.1-9 summarizes available data on effects of total suspended solids on aquatic biota. The results presented in the table, however, are evaluated effects over long periods of time, whereas maximum effluent TSS concentration from the site is expected to occur only during storm periods of short duration, and exceed observed ambient maximum TSS concentrations by no more than 7 mg/l. The slight increase in turbidity for short periods is not expected to have an adverse affect on the biota in the downstream portions of Catfish Creek.

4.1.4.1.2 Source and Receiving Water Body

Figure 3.4-4 shows areas of construction in Lake Ontario. Construction details are presented in Section 4.1.1. Makeup and blowdown lines will be placed in a rock tunnel beneath the lake bottom. Tunneling will eliminate impact upon the relatively more biologically productive inshore habitat. The loss of benthic habitat will be limited to the sites of the velocity cap intake structure and the discharge diffuser. These areas are a small portion (approximately 300 sq ft) of the lake bottom which is available to macroinvertebrates. Initial construction will eliminate approximately 1.7×10^4 macroinvertebrates, with a biomass of 7.0 g (ash-free dry weight of *Gammarus* sp., Sphaeriidae and Gastropoda) which represents approximately 0.15×10^{-3} percent of the mean biomass in the study area (Section 2.2.2.1.5.8 and Appendix Tables 2.2D-36 through 2.2D-55).

Physical disruption of Lake Ontario bottom sediments during placement of the discharge diffuser and inlet will temporarily increase levels of solids in the immediate area. The bottom sediment in this area is mostly sand underlined with sedimentary rock (Section 2.4.1.1.8). Since the sediment is relatively free of silt and clay, settling of the resuspended solids should occur within a short period of time and elevated turbidity will be temporary and localized.

Effects of construction on other forms of aquatic life near the inlet structure and discharge diffuser will be short term and localized. Plankton populations may be temporarily affected by increased turbidity, but as described above, turbidity should dissipate rapidly because of the nature of the sediments to be disturbed. Effects on the periphytic algal community will be very limited because little attached algae grows at the 30-ft depth contour (Section 2.2.2.1.3). Likewise, ichthyoplankton populations are expected to be impacted only minimally, because densities were generally low at the 30-ft contour (Section 2.2.2.1.7) and because of the small areas affected. Adult and juvenile fish should not be adversely impacted because their mobility which will enable them to avoid areas of construction activity. The overall impact of this construction activity on the aquatic organisms will be minimal.

During construction, water will be obtained from onsite wells for the first 2 years. After this time, a temporary intake line from Lake Ontario will

provide the balance of construction water. Maximum withdrawal of water for construction water use will be approximately 450 gpm. This small quantity of water is not expected to have an impact on Lake Ontario biota. The construction of the trench to lay the temporary construction water intake and discharge pipelines will have only a temporary effect on the aquatic organisms along an approximately 2000-ft path in the lake. The overall effects will be similar to those discussed for the inlet structure and discharge diffuser.

The discharge of sanitary wastes into Lake Ontario during construction will meet applicable State and Federal regulations (Section 4.1.1) and will not be expected to impact the aquatic biota.

4.1.4.2 Water Quality Environmental Impacts

4.1.4.2.1 Effluent Discharges

Various procedures will be used to control erosion and sedimentation associated with construction activities. The erosion control plan, including the sediment detention basins, and the discharge locations are described in Section 4.1.4.1.1.2, and summarized in Section 4.5.

The basins will creat runoff from major site construction areas and water from major onsite excavation dewatering. The basins are designed to treat the volume of runoff that would result from a 10-year, 24-hr storm. Effluent from the basins will meet the requirements in 40CFR423 with a suspended solids concentration no greater than 50 mg/l. Once clarified, the effluent will be discharged to Catfish Creek via the diverted stream. Due to the low level of suspended solids in this effluent, there will be no adverse impact to these water courses or to Lake Ontario.

The sediment detention basins will have emergency spillways to handle runoff during conditions that exceed design. During such conditions runoff into watercourses and Lake Ontario from natural sources will contain high concentrations of suspended material. In such a situation, the incremental runoff added from the emergency spillways will have an insignificant effect on the water quality of the water courses on the lake in light of the high sediment load carried by other sources into the water courses and lake.

During the initial stages of construction, chemical toilets are used, thus eliminating the need for the discharge of any sanitary wastes. A sanitary waste treatment plant that provides secondary treatment will be operational after the second year of construction. (A description of the sanitary waste treatment system is presented in Section 3.7.) Treated effluent from this plant will satisfy 1. the New York State requirements, as promulgated in plant Section 17-0509 of the Environmental Conservation Law and 2. the federal criteria set forth in 40CFR133. The effluent will be discharged into Lake Ontario through a temporary piping system. The maximum flow of sanitary wastes through the treatment plant will be approximately 45,000 gpd. Because the sanitary discharges are small and will be adequately treated, the water quality of Lake Ontario will not be adversely affected.

4.1.4.2.2 Construction of Shoreline Facilities and the Intake/Discharge Structures

Temporary Intake/Discharge

Excavation of the trench required for construction of the temporary intake/discharge pipelines and structures (Section 4.1.1.9) will increase the concentration of suspended solids in the immediate vicinity of excavation activities. The sediments to be disturbed are gravelly and silty sands. The sand portion of the sediments will settle rapidly without increasing turbidity outside of the immediate area. Any silt size particles will remain in the water column longer than the sand. However, increases in turbidity will occur only in proximity to, and for approximately the daily duration of active excavation. The entire trenching activity is estimated to require 6 weeks, thus any effects will be temporary.

Lake bottom contours will not be permanently altered by installation of the temporary intake/discharge pipeline. Lake flow will not be changed by construction of the temporary intake/discharge structures. The cumulative hydrologic impact of the temporary intake/discharge system is negligible.

Shoreline excavation for the temporary system will be of limited duration and extent. Relatively small amounts of soil or sediment will be disturbed and released into Lake Ontario. Some increased turbidity will be experienced but will be limited to the immediate excavation vicinity. Modification of the shoreline contour by excavation is negligible.

Cooling Water Intake/Discharge

Physical disruption of a very small portion of the bottom of Lake Ontario during construction of the intake/discharge structures will temporarily increase levels of suspended sediments in the immediate vicinity of the installations. The bottom sediment in this area is primarily sand underlain with sedimentary rock. Because the sediment is relatively free of silt and clay, the resuspended material should settle in a short time, and the increased turbidity will be temporary and localized. The resulting water quality impact will be insignificant.

A tunnel leading to the inlet structure and diffusers will be excavated through rock under the bottom of Lake Ontario. The rock extracted during this process will be used in the construction of the pumphouse or as fill material around the station. There are no plans for other construction activites that might significantly affect the water quality of Lake Ontario.

4.1.4.2.3 Relocation of Onsite Streams

The construction of the station will require the relocation of a tributary of Catfish Creek, as described in Section 4.1.4.1.1. The water quality effects of the diversion activity are expected to be minimal because of its short duration. Procedures used to minimize erosion and adverse impacts on the

water quality of the diverted stream, Catfish Creek, and Lake Ontario, are described in Sections 4.1.4.1.1.1 and 4.1.4.1.1.2.

4.1.5 Noise Environmental Impacts

4.1.5.1 Introduction

The construction of any large facility generates noise and can therefore affect the acoustical environment of the area surrounding the construction site. The assessment of the noise impacts from station construction includes a characterization of the existing acoustical environment (Section 2.7), an analysis of the noise from the construction site, and an evaluation of the effects of the construction noise on the receptors in the area.

Onsite construction activities can be categorized as either continuous or intermittent. Generally speaking, continuous activities are those activities that occur regularly and set the long term levels of construction noise. Intermittent activities, although they can produce high noise levels, occur infrequently and generally do not affect the long term construction noise levels. The total construction noise emissions comprise the sound produced by the major noise sources associated with continuous and intermittent activities. The "major" sources of construction noise are those sources which measurably contribute to the noise received by the surrounding community.

The sections that follow describe the techniques used to assess the noise impacts of constructing the proposed station. Section 4.1.5.2 discusses the major continuous onsite construction equipment, describes the methods used to predict continuous construction noise emissions, and evaluates the effects of such noise on the surrounding area. Intermittent and offsite construction activities and their impacts are discussed in Section 4.1.5.3. Offsite transportation associated with the station's construction and its impact is addressed in Section 4.1.5.4. The total noise impact on the community from all aspects of the station's construction is summarized in Section 4.1.5.5.

The impact of the concrete batch plant, discussed in Section 4.1.6.1, on the ground level concentration of TSP has been estimated with a simple Gaussian diffusion equation, using hypothetical worst case weather conditions. Table 4.1-13 summarizes the batch plant emissions, assumptions, and formulae used in calculating the maximum 24-hr average TSP concentration, which is 1.86 ug/cu m at the nearest site boundary. This is less than 2 percent of the 150 ug/cu m 24-hr TSP Ambient Air Quality Standard (AAQS).

The upwind edge of the proposed construction parking lot will be approximately 950 m from the nearest site boundary. Construction worker vehicles will leave the parking lot by two exits that lead to two onsite roadways. This traffic will be regulated, after consultation with appropriate governmental agencies, to ensure a smooth flow of vehicles. For these reasons, there will be no significant effect on any offsite receptor. The parking lot is considered a significant indirect source of air pollution under 6NYCRR203, which requires a mandatory review of air quality impacts of all pollutants emitted. Table 4.1-14 summarizes the parking lot emissions, assumptions, and methodology used in estimating impacts for construction worker vehicles. This analysis (using the method described in Guidelines for Air Quality Maintenance Planning and Analysis[40] modified by corrections from Compilation of Air Pollutant Emissions Factors[41]) shows that the maximum 1-hr average CO concentrations would be 5.6 mg/cu m at the nearest site boundary. This is only 14 percent of the 1-hr CO AAQS of 40 mg/cu m. The 8-hr CO AAQS of 10 mg/cu m also could not be violated, since the maximum 1-hr parking lot concentrations will occur for approximately 2 hr per day. Ambient CO concentrations are expected to be low, as discussed in Section 2.3.7.

The line of traffic formed at each of the two onsite access roads would cause a maximum 1-hr CO concentration (at a point perpendicular to and 10 m downwind from the edge of the road segment) of 10.5 mg/cu m (Table 4.1-14) which is only 25 percent of the 1-hr CO AAQS. Since the line of traffic would exist for an hour or less, the 8-hr average standard would not be exceeded.

The 1-hr impact of NOx was quantified in a manner similar to that for CO. The 1-hr average NOx concentration at the nearest site boundary to the parking lot will be 296.0 ug/cu m. This assures that the annual average AAQS for nitrogen dioxide (NO_2) of 100 ug/cu m will not be exceeded, since the maximum 1-hr parking lot concentrations will occur for at most 2 hr per day. Present ambient NO_2 levels, as discussed in Section 2.3.7, do not exceed 12.6 ug/cu m at NYSE&G's monitoring Station B, which is the air quality monitoring station most representative of site conditions.

The impact of hydrocarbons (HC) was quantified in a similar manner. The 3-hr average HC concentration at the nearest property line to the site boundary was shown to be 53.3 ug/cu m. This is only 33 percent of the 3-hr HC standard of 160 ug/cu m. Ambient concentrations of HC are expected to be low because there are few local sources of HC.

Permanent access roads used by the construction work force will be paved and kept free of dust to reduce fugitive emissions. Since it is expected that onsite spoil will be disposed of onsite, there will be no construction

vehicles producing fugitive dust as a result of offsite disposal. Materials that might blow away will be delivered in covered vehicles.

Effects on Site Micrometeorology

The effect of construction on the micrometeorology of the area is expected to be insignificant. The removal of some onsite trees may alter the wind flow and turbulence characteristics, but the change would be minimal. Fugitive dust emissions and smoke may decrease visibility slightly. These effects are not long term and will not affect offsite micrometeorology.

4.1.7 Flooding Environmental Impact

During the early stages of construction, the stream flowing through the site (a tributary of Catfish Creek, as described in Section 4.1.4) will be diverted to a permanent channel. The permanent channel is designed to contain flows in excess of the 100-year flood. Accordingly, the construction area and access roads are protected from inundation by such flood flows.

The effects of channel diversion will be evidenced by a minimal increase in flows conveyed in Catfish Creek Tributary F, downstream of the Tributary FE diversion. An analysis was performed using techniques described in "Model Hydrographs"[42], in conjunction with runoff predictions of 50- and 100-year precipitation events made through the use of the HEC-1 computer program[43]. This analysis indicated that the stream diversion would result in an increase in flows of approximately 1 percent at the mouth of Tributary F. This increase is primarily due to the decrease in the time of concentration as a result of shortening Tributary FE by approximately 1,200 ft when it is diverted to its permanent channel.

Alterations in ground cover do not significantly affect overall hydrologic response of the basin associated with Tributary F, since the site area to be developed is small, approximately 7 percent of the total drainage basin area of 3.18 sq mi. These changes are not expected to alter the present conditions with regard to flooding environmental impact.

4.1.8 Ground Water

Potable water requirements (approximately 50 gpm) for initial construction activities will be supplied by a well located onsite. The well will supply potable water for approximately 2 years until a temporary line is constructed to Lake Ontario which would provide the balance of potable water during the remaining construction period. The well is located approximately 30 ft north of boring G-83 (Figure 2.5-34) on the east side of Butterfly Creek and is on the opposite side of Lee Road from domestic well No. 254 (Table 2.1-46 and Figure 2.5-18). The well is 6 inches in diameter and is drilled to a depth of 65 ft (35 ft into rock). Most of the well yield is derived from a highly jointed zone at the top of bedrock. Well recharge is primarily from infiltration of groundwater within the low area along Butterfly Creek. A pumping/recovery test was conducted for a 48-hr period at a pumping rate of 65 gpm. On the basis of this test, it is anticipated that the static pressure

head within the jointed rock aquifer at well No. 254 will be reduced by approximately 15 ft. However, the water level (water table) in the overburden aquifer will drop only a few feet. Given the demand of only 2 to 5 gpm typical for domestic wells, and the small drawdown associated with such flow, pumping of the potable water should have no impact upon the users of well No. 254 and other offsite wells.

There are 53 private wells located within the site boundary (Table 2.1-46 and Figure 2.1-18) and cumulatively they yield considerably more than 50 gpm. These wells will be taken out of service or may be used selectively as part of the construction water supply system.

No major dewatering problems are anticipated during excavation and backfilling operations. Water will be removed by sump pumps installed within the excavation. Sediment detention basins will be used for clarification prior to discharge to surface waters. Excavation dewatering should have no effect on ground water quality.

As discussed in Section 2.4.2, the permeability of the overburden materials in the area of plant excavations is low. Therefore, seepage will have only a limited effect on groundwater levels onsite. As discussed in Section 6.1.2.2, groundwater levels are not expected to be affected 1,000 ft or more beyond the excavations. Additionally, the northwesterly flow through the site will be essentially unchanged.

Since groundwater quality should not be affected during construction, the groundwater monitoring program will consist of monthly readings of water level only. Readings will be taken in those existing observation wells not affected by construction activities (Figure 2.5-48). Wells presently located within the plant structure or construction facility areas (Figure 3.1-15) will be abandoned. The remaining wells will be monitored to provide general data on site groundwater levels during excavation dewatering. Additional wells will be installed as needed in areas of specific interest, such as the switchyard excavation slopes (Figure 3.1-2) in order to monitor drawdown which could affect domestic well performance and to verify design groundwater levels.

Butterfly Creek is located approximately 700 ft east of the Unit 2 reactor plant service water cooling tower. The normal water level in the creek at this point is about el +320 msl. The ground water level at the location of the reactor plant service water cooling tower is el +340 (Figure 2.5-45). Foundation grade for the reactor plant service water cooling tower is el +295 (deepest excavation onsite) which is 25 ft lower than the water level in the creek. There are at least 15 ft of glacial till (boring S-21, Appendix 2.5C) underlying Butterfly Creek at its nearest approach to the site. The till increases in thickness to a maximum of 36 ft (boring G-12, Appendix 2.5C) between the creek and the Unit 2 reactor plant service water cooling tower.

As discussed in Section 2.4.2, ground water movement is primarily in the upper 5 to 10 ft of jointed and detached rock slabs occurring at the bedrock surface. The bedrock surface rises from el +300 below Butterfly Creek (boring

S-21) at its nearest approach to the site, to el +333 (boring G-21) at the Unit 2 reactor plant service water cooling tower. The top of rock at the creek is 5 ft higher than the bottom of the reactor plant service water cooling tower excavation; however, the bedrock surface is 33 ft higher at the cooling tower. Field percolation and water pressure tests (Tables 2.5-6 and 2.5-9) indicate that the till and rock at depth (below 10 ft - the weathered zone at bedrock surface) are of low permeability. Dewatering of the Unit 2 reactor plant service water cooling tower excavation will cause a local depression in the ground water table. Ground water and/or surface water conditions at Butterfly Creek should not be affected due to the distance involved (700 ft), the thickness (36 ft max) of impervious overburden materials between the creek and the site, the depth to rock at the creek (20 ft), and the eastward sloping bedrock surface.

Several private wells (Figure 2.1-18) are located along Route 104 south of the excavation required for the switchyard (Figure 4.1-11). Both shallow dug wells (12 to 38 ft) and drilled wells (60 to 90 ft) are present in this area (Table 4.1-15). Ground surface at the location of the wells ranges from el 410 to 435. The excavation for the switchyard will require a maximum cut of 40 ft (el 380 to 420) with the top of the cut slope located approximately 350 ft north of Route 104. Existing topography, planned final grade, and wells nearest the excavation are shown in Figure 4.1-11. Well Nos. 96, 98, 100, and 101 are located within the site boundary and will be purchased and taken out of service prior to the start of construction.

The site surficial map (Figure 2.5-19) and data obtained from the ground water users survey (Section 2.1.3.8) indicate that the wells south of the switchyard are located on a drumlin ridge which has a thick till core. Yields from wells in till are normally low, and shallow dug wells are subject to decreasing yields during dry seasons. In areas where till is extensive, or of considerable thickness, yields sufficient for domestic supplies are usually obtained from wells that penetrate the till/rock contact.

The switchyard excavation will cause a permanent lowering of the ground water table to the south. No change in the direction of ground water flow will occur as a result of the excavation, and no subsurface injection of water is planned. Thus, the excavation will have no effect on ground water quality. Drawdown model studies (Section 6.1.2.2) indicate that the effect will be local. The profile in Figure 4.1-12 shows site topography and ground water conditions prior to and after excavation of the switchyard. Existing elevations, depths, water levels, distance to the switchyard excavation, and predicted drawdowns for the nearest wells are summarized in Table 4.1-15.

Wells Nos. 92, 95, 97, and 99 are deep-drilled wells of small diameter and lowering of the water level by 9 to 13 ft in these wells should have little effect on the total yield. However, lowering of the water level by 5 to 11 ft in the larger diameter, shallow dug wells (Well Nos. 89, 90, 91, 93, and 94) will decrease available storage capacity and may significantly reduce yields. In order to mitigate this impact, new deep-drilled wells will be installed on the properties containing Well Nos. 89, 90, 91, 93, and 94 prior to the start of construction. These are all shallow dug wells (12 to 20 ft) located

outside the site boundary, at distances of 430 ft (Well No. 94) to 610 ft (Well No. 90) south of the switchyard excavation.

Other wells shown in Figure 4.1-11 are at greater distances from the switchyard excavation and will not be affected. Well Nos. 102 and 103 are deep-drilled wells located more than 1,000 ft southeast of the switchyard excavation. No reduction in water levels or yields are anticipated in these wells because of the distance to the excavation and the depth of the wells. Well Nos. 84 to 88 are located over 900 ft southwest of the excavation on the opposite (west) side of an unnamed creek that drains a large swamp south of the wells. These wells will not be affected by the switchyard excavation because of the distance to the excavation and their proximity to the swamp and the creek that flows between the wells and the switchyard.

Prior to, during, and for at least 2 years after excavation of the switchyard, water level readings will be taken in observation wells installed between the excavation and the nearest offsite users (Section 6.2.1.1.4), and in selected private wells located within the site boundary. Actual water level readings will be compared to the drawdowns predicted by the model study. The results of this monitoring program will be included in the Environmental Report - Operating License Stage.

There will be essentially zero discharge to groundwater of washwater from the concrete equipment washwater treatment and reuse system. No impact on groundwater users is expected as a result of operating this system.

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TABLE 4.1-1

ESTIMATED CHARACTERISTICS OF SANITARY WASTES TREATED DURING CONSTRUCTION***

Frequency*				Volume** (million gal)			
				Yearly		Monthly	
Collection	Treatment	Transportation	Disposal	Max	Avg	Max	Avg
C	C	P	C	18.4	11.6	2.7	0.95

	Concentration (mg/l)		
	Yearly	Monthly	
	Avg	Max	Avg
BOD_5	350	350	350
SS	200	300	200

	Weight** (thousand lb)			
	Yearly		Monthly	
	Max	Avg	Max	Avg
BOD_5	65	33	7.7	2.7
SS	38	19	4.5	1.6

NOTES:

* Key: C, continuous; P, periodic (sludge only)

** Based on maximum yearly work force 3,135 men/day
Based on average yearly work force 1,584 men/day
Based on maximum monthly work force 4,505 men/day
Based on average monthly work force 1,584 men/day

*** The quantities given do not include the first two years of construction when sanitary waste will be treated in an off-site facility.

TABLE 4.1-2

PREDICTED DISCHARGE CHARACTERISTICS OF THE SANITARY SYSTEM USED DURING CONSTRUCTION

Discharge	Quantity (lb/mo) Max	Avg	Concentration*
Sanitary Facility**			
Floating and settleable solids	0	0	0
Suspended solids	677	245	30 mg/l for 30 consecutive day average 45 mg/l for 7 consecutive day average
BOD_5	677	245	30 mg/l for 30 consecutive day average 45 mg/l for 7 consecutive day average
Fecal coliform bacteria	NA	NA	200 MPN****/100 ml for 30 consecutive day geometric mean 400 MPN****/100 ml for 7 consecutive day geometric mean
Chlorine	11.3	4.1	0.5***
pH	NA	NA	6 to 9

NOTES:

* Except for pH and fecal coliform bacteria

** Discharge will conform with federal (40CFR133) and state (Title 5 Section 17-0509 of NYS Environmental Conservation Law Title 9200 Chapter 9210 of the New York DEC Policies and Procedures Manual) requirements.

*** A controlled chlorine concentration of 0.5 mg/l as Cl_2 will be maintained in the discharge for disinfection purposes. Chlorine will be introduced by the addition of sodium hypochlorite.

**** Most probable number.

TABLE 4.1-15

EFFECT OF SWITCHYARD EXCAVATION ON PRIVATE WELL SYSTEMS

Well* No.	Surface** Elev. (ft)	Distance to*** Excavation (ft)	Well Elev. (ft)	Depth** (ft)	Existing**** Water Level Elev. (ft)	Calculated Drawdown (ft)	Effect on Well/Comments
89	410	540	398	12	410	8	New well to be installed
90	414	610	394	20	410	5	New well to be installed
91	418	570	398	20	410	7	New well to be installed
92	420	500	330	90	410	9	Minor-deep drilled well
93	420	475	unknown		410	10	Assume shallow dug well; new well to be installed
94	420	430	382	38	410	11	New well to be installed
95	424	440	364	60	410	10	Minor-deep drilled well
97	434	380	339	95	410	13	Minor-deep drilled well
99	435	470	355	80	410	10	Minor-deep drilled well

NOTES:

* See Figure 2.1-18 and 4.1-11 for location of wells.
** From Table 2.1-46
*** Scaled distance (Fig. 4.1-11) from excavation slope
**** Water level used in computer model

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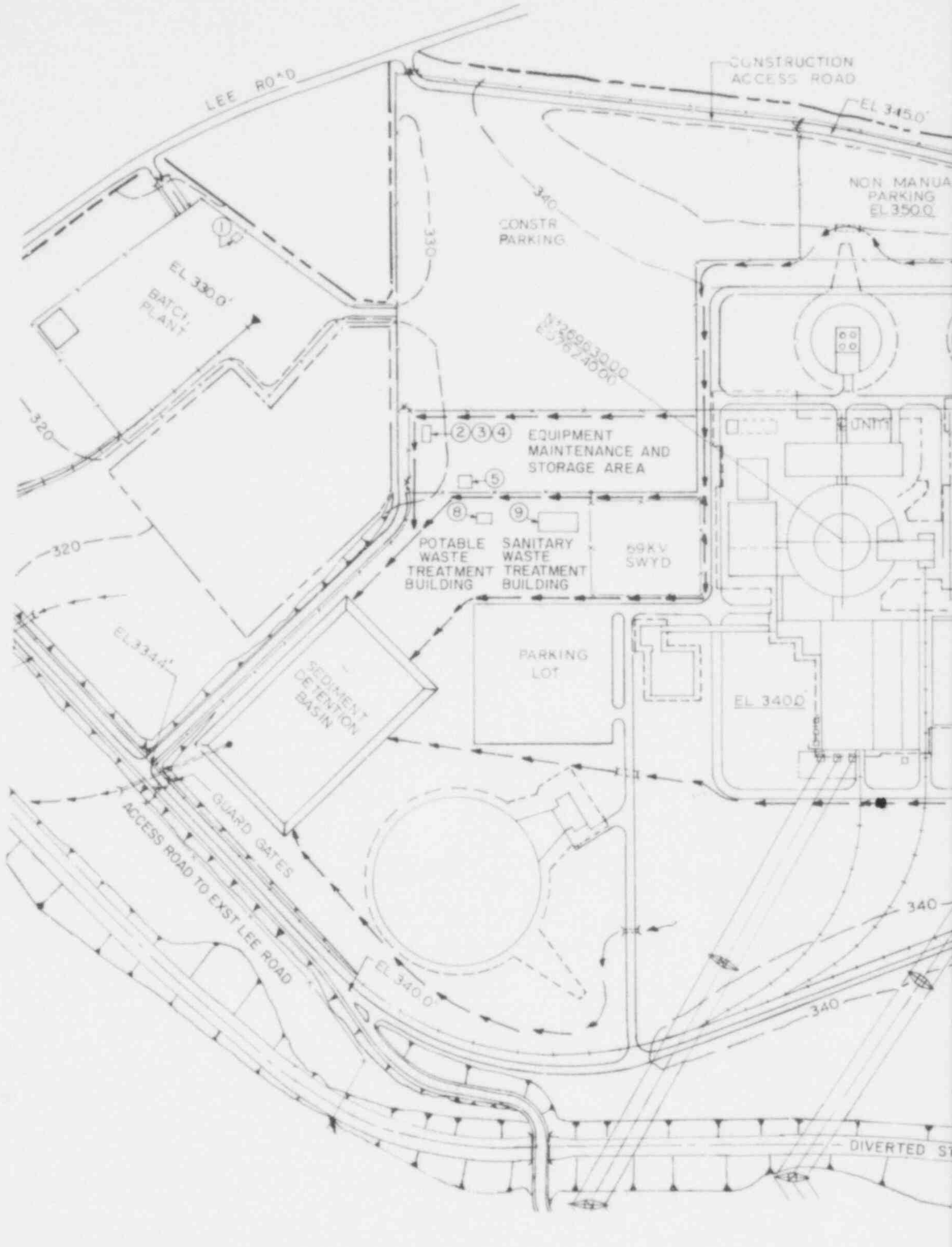
TABLE 4.1-16

EXPECTED STORAGE OF CONSTRUCTION OILS, LUBRICANTS, AND CHEMICALS*

Material	Container	Total Storage (gal)	Expected Containment
Fuel oil (batch plant boiler)	Tank	5,000	Below ground
Diesel fuel oil	Tank	20,000	Below ground
Leaded and unleaded gasoline	Tanks	20,000	Below ground
Kerosene	Tank	15,000	Below ground
Lubrication oil (all types and grades)	55 gal drums	10,000	Curbed area within enclosed facility
Cleaning solvents	55 gal drums or	1,400	Enclosed trailer
Paint, thinner, and solvents	Small containers	1,000	Enclosed trailer
Sulfuric acid (93%)	Tank	500	Curbed area within potable water treatment building
Sodium hydroxide (50%)	Tank	500	Curbed area within potable water treatment building
Sodium hypochlorite (15%)	Tank	200	Curbed area within sanitary waste treatment building

NOTE:

* Refer to Figure 4.1-11 for storage locations of above items



NOTES:
1. SCALE: AS SHOWN
2. REF DWG: FIGURE 3.1-15

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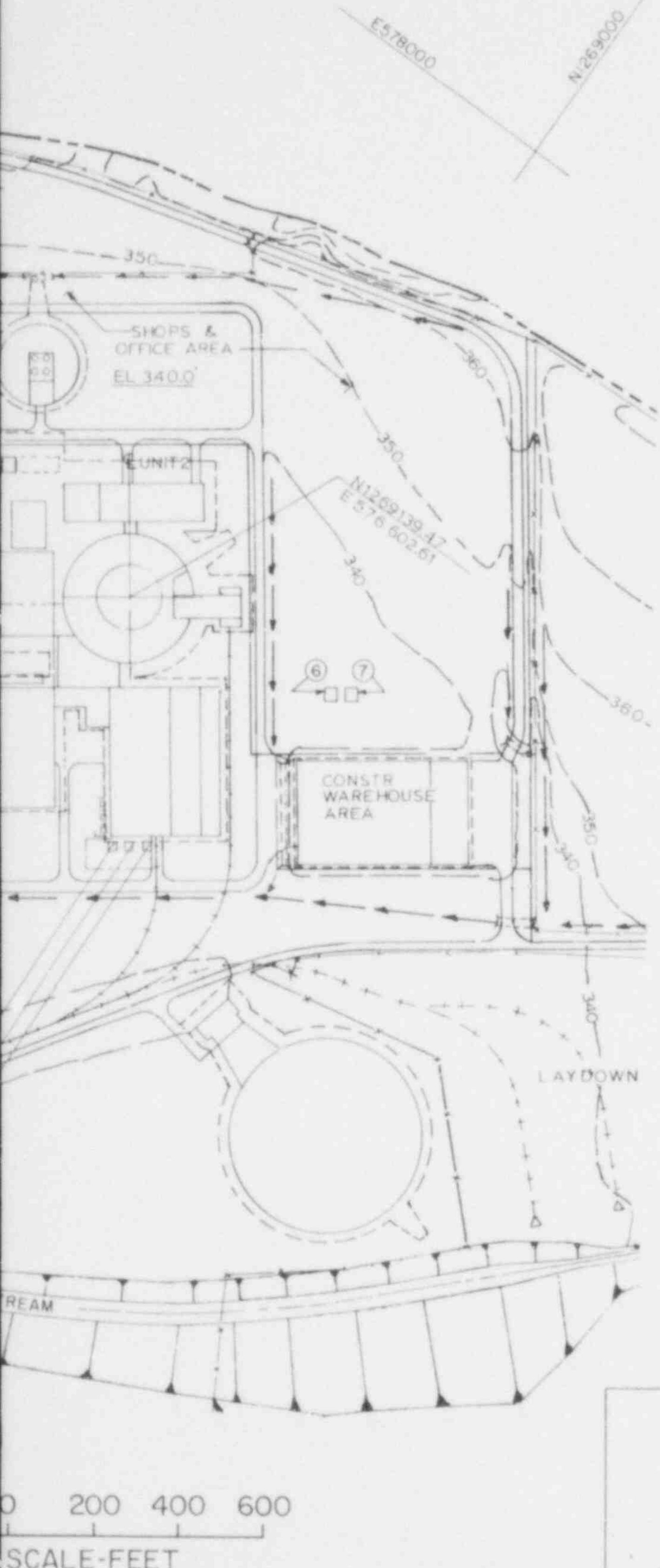

KEY

1. BATCH PLANT BOILER FUEL OIL TANK
2. DIESEL FUEL OIL TANK
3. UNLEADED AND LEADED FUEL TANKS
4. KEROSENE STORAGE TANK
5. LUBRICATION OIL (ALL GRADES & TYPES) IN 55 GALLON DRUMS
6. CLEANING SOLVENTS
7. PAINT, THINNER AND SOLVENTS
8. SULFURIC ACID AND SODIUM HYDROXIDE
9. SODIUM HYPOCHLORITE

ITEMS ① THROUGH ④ WILL BE BELOW GROUND STORAGE. ALL OTHER ITEMS WILL BE STORED WITHIN AN ENCLOSED FACILITY. TABLE 4.1-15 LISTS ESTIMATED QUANTITIES FOR ABOVE ITEMS.

LEGEND

- - - - - - -	MAJOR EXCAVATION
——— - - - ———	LIMIT OF CONSTRUCTION
→ → → →	DRAINAGE DITCHES
⊐ = = = ⊏	CULVERT
———x———	CONSTRUCTION FENCE
— — 360 — —	PROPOSED CONTOURS

FIGURE 4.1-13 NEW HAVEN SITE

LOCATION OF STORAGE FACILITIES FOR CONSTRUCTION LUBRICANTS, OILS, AND CHEMICALS

NEW YORK STATE ELECTRIC & GAS CORPORATION
ENVIRONMENTAL REPORT

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4.5 CONSTRUCTION IMPACT CONTROL PROGRAM

The following is a summary of mitigative and precautionary measures considered for controlling potential environmental impacts during the construction of the facility. The implementation of these measures are achieved by a detailed enforcement program which will be completed prior to the initiation of construction.

Most environmental impacts associated with construction activities are expected to be short term, approximately 7-1/2 years. Figure 3.1-15 shows the areas affected by construction. Preventive measures will be taken to minimize environmental impacts in these areas.

4.5.1 Mitigative Programs

4.5.1.1 Noise

Noise control for the construction site will be accomplished in several ways. Most construction activities which will be major sources of noise will occur during the weekday daytime hours. Major internal combustion equipment will be equipped with properly installed mufflers. In addition, all equipment will comply with all applicable state and federal regulations. Building siding will be installed at the earliest possible date to confine noise from interior construction activities.

4.5.1.2 Erosion

Various methods will be used to control soil erosion and sedimentation during construction (Section 4.1.4.1.1.2). To minimize soil erosion in cleared areas, protective material such as gravel, crushed stone, and pavement are used. Road shoulders are stabilized with crushed stone.

Diversion ditches and berms will be used to prevent water from entering construction areas and to prevent water from flowing down unstabilized slopes.

Soil loss is also controlled by nonstructural measures such as temporary vegetation or mulching with natural wood fibers, jute or excelsior matting, and straw bale barriers. The loss of topsoil is further minimized by the technique of stockpiling and stabilizing during the construction period.

Runoff from vegetated and stabilized areas is diverted to vegetated buffer strips and existing drainage swales. The vegetated buffer strips filter out most of the suspended solids from runoff.

Runoff from disturbed or unvegetated soils is directed to three sediment detention basins by a series of ditches and culverts as shown in Figures 3.1-15, 3.1-15a, and 3.1-15b.

A temporary construction storm drainage system consisting of a network of drainage ditches and culverts collects runoff from areas of potentially high sediment loads and directs it to the appropriate sediment detention basin.

The drainage ditches are lined with protective material such as crushed stone to minimize erosion. As construction progresses, the permanent drainage system and final grading are incorporated.

A tributary of Catfish Creek, as described in Section 2.1.3.9, flows through the site and will be diverted to the western boundary of the site. The diversion channel controls the runoff from the watershed immediately south of the site. This channel also intercepts other runoff toward the site and diverts the storm water to natural drainage areas. To minimize erosion, the channel is lined with riprap and slopes are seeded with grass.

Construction of the offsite makeup/blowdown pipeline will progress in a continuous cut and cover operation thereby minimizing the extent of open excavations and allowing an ongoing process of stabilization and restoration of disturbed areas. Erosion control methods will include the use of diversion ditches and berms to control runoff, straw bale barriers, filter berms, jute or excelsior matting, mulching, and seeding. Excavation dewatering from groundwater or stormwater runoff will be discharged to ditches adjacent to the excavation. The ditches will be designed to spread flow over wide areas of undisturbed ground and will not discharge directly to streams. Straw bale barriers will be used to filter out most of the suspended solids prior to discharge over undisturbed areas. Construction access roadway alignment will avoid, as much as possible, locations that will collect large volumes of natural runoff.

Construction of the offsite rail access is discussed in Section 4.1.1.4. Erosion control methods similar to those for construction of the makeup/blowdown pipeline will be used. Straw bale barriers, filter berms, or the equivalent will be provided across the path of runoff from disturbed areas and will be maintained until the disturbed area has been stabilized with vegetation, ballast, or crushed stone.

4.5.1.3 Dust

After the initial site preparation work is completed, the primary source of construction-generated dust is expected to be the unpaved construction roads. Permanent roads within the site are established and stabilized during the early stages of construction to minimize dust problems. Traffic is limited to stabilized roads, when possible, and held to a minimum. Temporary construction haul roads within the site will either be surfaced or periodically watered to minimize dust problems. Semipermanent roadways and parking areas are paved with asphalt or covered with crushed rock. Paved surfaces will be cleaned periodically to minimize dust. Another potential source of dust is wind erosion of cleared areas. The erosion control plan described in Section 4.5.1.2 will also serve to control dust.

The use of explosives during construction will conform to OSHA regulations, and blasting will be matted as necessary to minimize flying rock and dust.

4.5.1.4 Truck Traffic

All traffic to and from the station uses the limited access road.

Truck traffic, due to material deliveries, is scheduled during normal working hours. Deliveries are directed to the warehouse onsite for unloading either at the warehouse or into open storage. Truck traffic within the site is required to obey posted regulations and use construction roadways when possible.

4.5.1.5 Flooding

The site is not subject to flooding, as described in Section 4.1.7.

4.5.1.6 Ground Water

Dewatering of major onsite excavations below the groundwater table is done within the excavation by portable pumps. A series of ditches will convey groundwater, which seeps into the excavation to collection pits. Water in the pits is removed by portable pumps and discharged to the sediment detention basin.

Strict control of the use of potential pollutants minimizes infiltration of pollutants to the groundwater.

4.5.1.7 Air and Water Quality

The air quality impact during the construction of the station will be short term and is expected to be limited to the immediate site area.

The largest impact to air quality is expected to be emissions from equipment used to support construction activities. This equipment will be properly maintained and controlled to minimize adverse effects.

It is anticipated that some open burning will be required to dispose of timber, brush, and shrubs resulting from land clearing which cannot be chipped and will continue throughout plant construction where no other practical disposal method exists. Open burning will be conducted in accordance with the following guidelines:

1. Appropriate local, county, and state officials will be contacted regarding the scheduled burning to learn of any temporary ban on open fires because of drought or related fire hazard conditions, or of an air pollution episode as described in 6NYCRR207.

2. Open burning operations will be performed to minimize: a) the number of slash piles burning; b) the number of days open burning is used; and c) active fires during darkness.

3. Open burning will be conducted during meteorologically appropriate periods.

4. Open burning sites will be attended whenever a fire is in progress or when hot ashes remain.

5. Lightweight petroleum products may be used to ignite slash piles.

6. Tires and other unsuitable materials will not be burned.

Concrete batching materials at the onsite batch plant are stored in accordance with applicable American Concrete Institute codes. The aggregate conveyor systems at the batch plant are enclosed, and the cement is stored in closed silos. Emissions from the batch plant will comply with 6NYCRR212-4(c).

During the early stages of construction, a sediment detention basin is used for treating surface runoff from disturbed areas to remove suspended solids. Waste washwater from concrete handling equipment will be treated and then reused both as washwater and for dust suppression on onsite haul roads and construction areas.

Construction of the diverted stream will be performed to minimize runoff or will incorporate a temporary impoundment to establish compliance with 40CFR423.

Chemical toilets are initially provided for sanitary wastes. These wastes are collected on a regular basis and taken off the site by a licensed contractor for proper treatment and disposal. As construction activities progress, toilet trailers or their equivalent with sewer and water connections are also employed. Drainage is made to a sewage treatment plant at the site. Sanitary waste water effluent will be discharged to Lake Ontario. The treated effluent will meet 40CFR133 and DEC requirements for fecal coliform bacteria in Policies and Procedures Manual, Title 9200, Chapter 9210. In outlying areas, chemical toilets are used throughout the duration of construction.

4.5.1.8 Fish and Wildlife Protection

During construction of the station a number of measures will ensure minimal disruption of the plant and animal communities.

With regard to the terrestrial environment, site access is limited to designated roads and traffic is confined to these roads and to specific parking areas as much as practicable. Construction materials are confined to specified laydown areas. These measures prevent indiscriminate disruption of the natural habitat by the construction work force. Wastes generated during construction are hauled to appropriate disposal areas or burned. Enclosing the major portion of the construction area with a chain link fence will keep most wildlife out of the area.

Pesticides and herbicides used at the site during construction are chosen from those approved by the DEC.

Following construction, all temporarily disturbed areas will be revegetated.

Impacts sustained by the aquatic environment due to construction are mainly those associated with increased turbidity caused by the construction of the makeup water inlet and blowdown discharge system described in Sections 3.4.3 and 3.4.4, respectively. Section 4.1.1.7 describes the construction for the inlet and discharge structures. The small quantities of excavated material to set the inlet and discharge structures will be locally disposed of on the lake bottom. Tunneling the intake and discharge lines will eliminate turbidity caused by dredging, thus minimizing impact to the aquatic environment. Excavated material from the rock tunneling operation will be used in the construction of the pumphouse or as fill material around the station. As discussed in Sections 4.1.3 and 4.1.4, the mitigative measures described above reduce any construction impacts to fish and wildlife to acceptable levels.

4.5.1.9 Archeological Resources

As discussed in Section 2.6.2, there are no properties currently listed or currently being considered for the National Registry of National Landmarks or the National Register of Historic Places within the limits of station construction. The Applicant has contacted the State Historic Preservation Officer to determine if there are any historical or cultural properties currently under consideration for the National Register within the construction area.

The Applicant has performed an archeological survey to evaluate the significance of archeological resources found on site. The results of the survey will be presented in a report to be completed by early summer, 1979.

After the appropriate agencies have reviewed the report and determined if there are any eligible properties for the National Register, the Applicant will (if eligible properties were identified) consult with the agencies to determine the effects of construction and appropriate mitigating measures to be taken.

If the resources are significant and adversely impacted by the plant, the most probable and reasonable mitigation measure would be to extract the information available by having a professional archeologist(s) study the resource onsite before proceeding with construction. Depending upon the nature and significance of the resource, other measures including relocation of the resource might be implemented. The specific mitigation measure adopted for a particular resource will depend on many factors. Specific mitigation measures will be determined through discussions with officials of the responsible agencies.

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CHAPTER 5

ENVIRONMENTAL EFFECTS OF STATION OPERATION

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375,000 fish (87.5 percent of the total). Rainbow smelt comprised an additional 26,000 fish (6 percent), threespine stickleback 15,000 (3.6 percent), and gizzard shad about 4,200 fish (1 percent). Remaining species combined comprised about 1.9 percent of the total.

Highest estimated impingement will occur in April and May when alewives and rainbow smelt were inshore to spawn. A secondary peak comprised of young-of-the-year alewife and rainbow smelt will occur during the winter.

5.1.3.2.2.3 Combined Entrainment and Impingement Loss Estimates

Equivalent adult losses, (based on estimates of entrainment) were added to impingement estimates to account for all impacts of the intake even though the impact of entrainment was shown to be negligible. At this point in the evaluation, it was necessary to divide Morone spp. larvae between white perch and white bass. Because 90 percent of the adult Morone spp. collected in Mexico Bay during 1977 (Section 2.2.2.1.6) were white perch, all equivalent adults were added to white perch. Some may have been white bass.

The total estimated losses of fish equalled approximately 820,000 fish (390,000 equivalent adults and 430,000 impinged fish, Table 5.1-22). Alewives comprised 92 percent of the total, rainbow smelt 4 percent, and threespine stickleback 2 percent. All three numerically important species are forage fish in Lake Ontario; rainbow smelt have sport and commercial value as well. Other species having sport or commercial value included white bass, white perch, yellow perch, and lake herring. Highly prized sport fish such as trout, salmon, walleye, smallmouth bass, and brown bullhead, will not have been entrained or impinged because no larvae of these species were collected or less than one fish of these species per month were estimated to be impinged.

The total number of fishes per species was multiplied by the mean weight of fish collected in the Mexico Bay study area during the year (Table 5.1-23). The mean weight of rainbow smelt collected during April and May 1977 was used because many young-of-the-year were collected later in the year, which resulted in a mean weight for the year of only 4.5 g. Weight of impinged burbot was used because few adults were collected. When possible, the total weight of fish loss was compared with lakewide biomass estimates[36] and combined New York and Canadian preliminary commercial landings for 1977[37,38].

The total weight of alewife lost equalled about 0.04 percent of the Lake Ontario biomass estimate. The total weight of rainbow smelt lost equalled about 0.006 percent of the biomass estimate. These percentages were relatively high since every effort was made to keep impingement and entrainment estimates conservative (worst case) and the lakewide biomass estimates were stated by Schneider[36] to be conservatively low. The impact of impingement and entrainment on the two most numerically important species is therefore expected to be negligible.

Commercial landings were representative of the fish harvest rather than actual fish population numbers. Impinged fish and equivalent adults ranged from 0.03 percent of the yellow perch landings to about 5 percent of the rainbow smelt landings. No significant impact of commercially important species is expected.

In summary, the impact of intake operation on the major forage, commercial, and sport species will be negligible. The alewife will be the dominant species impinged and entrained by a large margin. It is also the dominant forage species in Lake Ontario and intake impact will affect a very small percentage of the population. The remaining species affected are primarily additional forage species in the lake. They are all of secondary importance to alewives and smelt as forage species. In the absence of standing stock estimates, little can be said about impact on populations of the species. A significant impact is unlikely in the loss of 259 emerald shiners to 15,453 threespine sticklebacks. The stickleback is the only one of these species estimated impinged in numbers greater than 1 percent of the estimated total. It is abundant near the shore at FitzPatrick Station[39] and the population appears to be increasing [40] indicating no adverse effects of impingement at FitzPatrick. Impact at the proposed station will be about an order of magnitude less because the volume of water required is smaller. It was therefore concluded that impact on the numerically dominant species impinged and entrained, and on the major forage, sport and commercial species, will be negligible.

5.1.3.2.3 <u>Discharge System Effects</u>

The proposed plant discharge system, including structures, equipment, flows, and temperatures, is described in Section 3.4.4.

Section 5.1.2 describes the physical characteristics of the plume. Under worst case conditions, which occur at a frequency of about 1 hr/10 yr, blowdown is expected to be diluted 10 times in 6 sec and will encompass a volume of only 34.8 cu m. Under worst case heat dissipation conditions, within 16 sec, the discharge ΔT near the surface will be only 1.6°C with a volume of 122 cu m.

The location for the proposed plant discharge diffuser is at the 26-ft depth contour of Mexico Bay in the center of the study area (Transect III, Figure 2.2-16), approximately 200-ft shoreward from the intake structure. The selected location was determined to be biologically acceptable based on findings of ecological studies conducted during 1977 (See Section 2.2.2). Rationale presented in Section 5.1.3.2.1 under Intake Placement are generally applicable for selection of the location for the diffuser. Because the diffuser will be located away from the most biologically productive areas (10 and 20-ft depth contours and the western portion of the study area), no significant adverse effects are expected (see details in the following sections).

TABLE 5.1-23

ESTIMATED BIOMASS OF EQUIVALENT ADULT LOSSES AND COMPARISON WITH LAKE ONTARIO BIOMASS AND COMMERCIAL PRODUCTION ESTIMATES

Species[a]	Equivalent Adult and Impingement Total Number	Mean Weight per Adult Fish Collected in Study Area[b] (Grams)	Total Weight Adults Kilograms	Total Weight Adults Pounds	Lake Ontario Biomass Estimates[c] (Kilograms)	Impinged and Entrained Weight ÷ Lake Biomass	Combined New York and Ontario Commercial Catch (Pounds) 1977[d]	Impinged & Entrained Weight ÷ Commercial Catch
Alewife	757,551	31.3	23,711	52,165	56.4×10^6	0.000420	-[e]	-
Rainbow smelt	31,236	32.5	1,015	2,233	16.0×10^6	0.000063	63,000	0.0354
Threespine stickleback	15,458	2.4	37	82	-	-	-	-
Gizzard shad	4,190	553.7	2,320	5,104	-	-	-	-
White bass	2,296	130.1	299	657	-	-	12,000	0.0548
Tessellated darter	2,235	2.4	5	12	-	-	-	-
White perch	2,049	127.7	262	576	-	-	356,000	0.0016
Spottail shiner	1,750	10.0	18	39	-	-	-	-
Trout-perch	1,057	14.4	15	33	-	-	-	-
Mottled sculpin	1,008	10.3	10	23	-	-	-	-
Yellow perch	600	126.4	76	167	-	-	631,000	0.0003
Emerald shiner	259	7.0	2	4	-	-	-	-
Rock bass	226	171.9	39	85	-	-	11,520[f]	0.0074
Lake herring	24	200.0	5	11	-	-	10,000	0.0011
Burbot	1	781.4[g]	0.8	2	-	-	-	-

TABLE 5.1-23 (Cont)

NOTES:

a. Species listed in order of abundance.

b. Adult fish collected by all sampling methods, April-December except rainbow smelt collected with gill net, April-July; gizzard shad and yellow perch collected with gill net and trawl, April-December; white bass and trout-perch collected with trawl, April-December; mottled sculpin and emerald shiner collected with trawl, April-December; lake herring estimated from Carlander, 1969.

c. Schneider, 1978.

d. Bouton, 1973.

e. No data.

f. U.S. waters only.

g. Mean weight of fish impinged at FitzPatrick, 1977.

5.2.5 Summary of Annual Radiation Doses

The calculated annual radiation doses to the maximum individual from liquid and gaseous pathways are presented in Tables 5.2-16 through 5.2-24. As can be seen from these tables and Table 5.2-25, the calculated annual radiation doses are below the design objectives of 10CFR50 Appendix I for the site. The maximum calculated dose was 4.2E+00 mrem/year to an infant thyroid. It represents an infant who resides at a location of 0.5 mi or 805 m south of the facility who obtains all of his or her milk from a goat located 0.8 mi 1,290 m north-northwest (maximum farm location) of the facility. All other calculated doses from gaseous releases to the maximum individual assume a residence and vegetable garden at 805 m south and a farm (for milk and meat) at a location 1,290 m north-northwest.

For the liquid releases, it was assumed the maximum individual obtains drinking water from the closest public water supply which is Oswego, located 11 m west or 17.7 km from the facility. The maximum individual was assumed to consume fish, invertebrates, and ducks caught at the edge of the initial mixing zone. This location was also used in calculating doses from swimming and boating. Food products assumed to be irrigated were irrigated with water taken from the closest accessible shoreline. The calculated doses from shoreline recreation also were performed at this location.

The calculated dose to the maximum individual from liquid pathways was 4.0 mrem/year to an infant thyroid. This dose was primarily a result of the consumption of goats milk. It was assumed the goat grazed on irrigated pasture for 6 month's of the year.

The calculated annual doses for the population residing within a 50-mi radius of the site are presented in Table 5.2-25. For the liquid effluents, the calculated whole body and thyroid doses are 7.3E+00 and 9.5E+00 manrem/year, respectively. The calculated doses from gaseous pathways are 1.1E+00 manrem/year whole body and 1.9E+00 manrem/year thyroid. These doses were calculated for a projected population in the year 2010 of 1.2E+06 people within 50 mi of the site. The milk, meat, and vegetation 50-mi radius crop yield as well as the 50-mi radius sport and commercial fish harvest are presented in Appendix 5.2A.

5.2.6 References for Section 5.2

1. Environmental Analysts, Incorporated. Standard Methodology for Calculating Radiation Dose to Lower Form of Biota. Prepared for the Atomic Industrial Forum and the National Environmental Studies Project, AIF/NESP-006, February 1975, p 33.

2. Brooks, N.H. Diffusion of Sewage Effluent in an Ocean-Current. In: Proceedings of the First International Conference on Waste Disposal in the Marine Environment, Oxford, Pergamon Press, 1960.

3. Murthy, C.R. Horizontal Diffusion Characteristics in Lake Ontario. Journal of Physical Oceanography, Vol 6, 1976, p 76-84.

4. Rochester Gas and Electric Corporation. Sterling Power Project: Nuclear Unit No. 1, Environmental Report; Construction Permit Stage, Appendix 2A, Rochester, NY, 1974.

TABLE 5.2-25

CALCULATED ANNUAL DOSES
FOR
POPULATION WITHIN 50-MILE RADIUS

	Population Whole Body	Manrem Thyroid
Liquid Effluents		
Ingestion of potable water	1.8E+00	7.0E+00
Ingestion of fish	5.4E+00	2.4E+00
Shoreline recreation	1.2E-01	1.2E-01
Swimming	6.2E-05	6.2E-05
Boating	8.6E-04	8.6E-04
TOTAL	7.3E+00	9.5E+00
Caseous Effluents		
Submersion	2.0E-02	2.0E-02
Inhalation	1.7E-01	3.2E-01
Standing on contaminated ground	6.4E-01	6.4E-01
Ingestion of fruits, grains, & vegetation	9.5E-02	3.6E-01
Ingestion of cow milk	1.3E-01	5.0E-01
Ingestion of meat	9.7E-03	1.1E-02
TOTAL	1.1E+00	1.9E+00

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CHAPTER 6

EFFLUENT AND ENVIRONMENTAL MEASUREMENTS AND MONITORING PROGRAMS

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6.2 NYSE&G'S PROPOSED OPERATIONAL MONITORING PROGRAMS

6.2.1 Nonradiological Surveillance

6.2.1.1 Aquatic-Abiotic

6.2.1.1.1 Chemical Discharges

Preoperational

The water quality monitoring program described in Section 6.1.1.1.2 was designed to document overall background concentrations of water quality parameters in the aquatic environment of the site area. These data will be supplemented by data generated during a 1 year preoperational study to be conducted approximately 2 years prior to the startup of Unit 1. It is anticipated that the area of both the intake and discharge structures will be monitored. The study will be designed to document any significant changes in ambient conditions of important water quality parameters that may have occurred since the baseline study. Water quality parameters to be studied will be those that are of major importance to aquatic ecology for parameters to be monitored, sampling locations and frequencies (Section 6.2.1.2).

Operational

Table 6.2-1 provides applicable water quality standards and effluent limitations. Due to the anticipated minor water quality impact of the proposed facility, it is expected that operational effluent sampling will primarily involve in-plant monitoring, in addition to water quality sampling conducted in conjunction with the operational aquatic ecology sampling efforts. The final design of the operational water monitoring program will be delineated in the Environmental Report - Operating License Stage.

6.2.1.1.2 Thermal Measurements

A thermal survey of the discharge plume is expected to be performed during the station's operational stage. The data obtained from this survey would be examined to ensure compliance with the thermal criteria for New York State (Section 5.1.1). The scope of this program will be defined in the Operating License stage of the Environmental Report.

In conjunction with the preoperational water quality monitoring program described in Section 6.2.1.1.1, ambient temperature conditions are expected to be monitored in the area of the discharge structure. As is the case with the preoperational water quality monitoring program, the thermal monitoring would be a 1-year study conducted approximately 2 years prior to the startup of Unit 1.

6.2.1.1.3 Erosion and Sedimentation

The facility is located approximately 2 mi from the shore of Lake Ontario; no permanent structures will be located along the shoreline. Erosion and

sedimentation are not expected, and consequently, monitoring along the shore is not proposed.

6.2.1.1.4 Ground Water

Site ground water conditions and the preoperational ground water monitoring program are described in detail in Sections 2.4.2 and 6.1.2.1, respectively. The parameters used to model the physical ground water regime are also presented in Section 2.4.2.1. Operational ground water conditions are not expected to differ significantly from preoperational conditions. Ground water conditions encountered during the construction stage will be documented and compared with original preoperational input. If differences exist, the impact on operational conditions will be evaluated and discussed in the Environmental Report - Operating License Stage.

The equipment for monitoring ground water conditions during operation will be a portion of that used for the preoperational program. Several existing observation wells will be maintained and monitored during the construction stage. If necessary, additional wells will be installed to assure that adequate water level monitoring locations exist between the site and the nearest down gradient users and/or surface water source. The operational ground water monitoring program will be described in detail in the Environmental Report - Operating License Stage.

Sections 6.1.5 and 6.2.2 discuss the operational monitoring of ground water for radionuclides.

6.2.1.2 Aquatic Biota

A preoperational monitoring program will commence approximately two years prior to startup of Unit 1. A map showing proposed sampling locations for the preoperational monitoring program is provided in Figure 6.1-6. The sampling locations will be on Transects I, III, and V of the baseline aquatic ecology study at the 10, 20, 30, and 40 ft depth contours, plus five shoreline locations. Table 6.2-2 provides the parameters to be collected, method of collection, sampling frequency, number of replicates, and the sampling locations and depths. Field laboratory and data analysis procedures will be the same as those used in the baseline aquatic ecology study. The water quality profiles for temperature, dissolved oxygen, and pH will follow the field procedures described in Section 6.1.1.1.2.3. Bottom gill net, bottom trawl, and seine gear descriptions and field procedures are presented in Section 6.1.1.2.8.2. Drift macroinvertebrate and ichthyoplankton will utulize the gear and field sampling procedures described in Section 6.1.1.2.9.2. Sample analyses procedures for drift macroinvertebrates, fish, and ichthyoplankton are presented in Sections 6.1.1.2.7.3, 6.1.1.2.8.3, and 6.1.1.2.9.3, respectively. However, no fish scale or stomach samples will be collected or analyzed. Descriptions of data analyses have been provided for macroinvertebrates in Section 6.1.1.2.7.4, for fish in Section 6.1.1.2.8.5 and for ichthyoplankton in Section 6.1.1.2.9.4. Approximately one year prior to initiation of the preoperational study, the program will be reevaluated and final details and modifications deemed necessary at that time will be proposed

7.3 OTHER ACCIDENTS

Oils, chemicals, and other materials are stored onsite in various areas. The accidental release of these to the environment could cause adverse effects. An evaluation of the effects of accidents which could cause such releases are included below.

The probability of accidental releases from any source is minimized by design of the storage and handling facilities, operator surveillance, and the attendance of personnel during operation. Table 7.3-1 shows the expected storage facilities for oils and hazardous chemicals at the station. Sections 3.6.3 and 3.6.4 describe the locations of storage facilities for oils and hazardous chemicals at the station, and details of their containment drainage.

The use of multiple storage tanks, building sumps, diked areas, and retention basins reduces the risks to the environment associated with storage of potentially hazardous materials.

7.3.1 Oil and Gasoline Spills

Oil will be used in various equipment and stored in tanks both inside and outside the station buildings (Table 7.3-1). The storage tanks are located in diked areas constructed of concrete designed to contain the volume of the single largest tank in addition to the runoff resulting from the one in 10-yr, 24-hr storm, as described in Section 3.6.4. The area is designed to prevent the release of stored materials to the surrounding surface water or ground water due to leakage, spillage, or ruptures of tanks.

Oil spilled or leaked inside buildings flows to appropriate sumps. Drainage is discharged following oil/water separation as required to comply with 40CFR423.

Potential spills or leakage from the auxiliary boiler fuel oil tank are contained within a diked area. Spills are recovered from the diked area and reclaimed or disposed of offsite by contractors licensed by the State of New York. Treated runoff from this area is discharged in compliance with the limitations of 40CFR423.

A 5,000-gal underground gasoline tank dispenses fuel to station vehicles during station operations using conventional service station pumps. Fuel unloading operations are attended by an operator who, in the event of a spill, initiates corrective actions. Surface spills during vehicle fuel operations are contained at the point of spillage and manually cleaned up. Underground spills affect a small area and are cleaned up manually.

Station and switchyard transformers are insulated and cooled by oil. Transformers are enclosed by dikes large enough to contain all the oil in the largest transformer in the diked area in addition to the runoff resulting from the once in 10-yr, 24-hr storm (Table 7.3-1). In the event of a spill, the

oil is reclaimed or disposed of offsite by a contractor licensed by the state of New York.

All oil unloading operations are attended by an operator who, in the event of a spill, initiates oil containment, recovery, or cleanup operations.

7.3.2 Chemical Spills

Diked areas constructed of impermeable material and/or station buildings will contain a spill if the chemicals stored in tanks onsite, both inside and outside the plant buildings, are released from their storage tanks (Table 7.3-1).

Indoor storage is provided for sodium hydroxide, which is used for regeneration of demineralizer resins and in the containment spray system. Indoor storage is also provided for other chemicals such as ammonia and hydrazine, which are used for steam generator water treatment. Concrete in the vicinity of these tanks is covered by a corrosion resistant finish to prevent deterioration. Outside storage is provided for sodium hypochlorite and for sulfuric acid.

Chemicals spilled inside the plant buildings flow to sumps where they are retained until pumped either to appropriate containers for disposal or to treatment facilities prior to discharge to ensure that no harmful substance is released to surface watercourses.

Chemicals spilled outside the station buildings are contained within diked areas and are recovered or cleaned up manually.

Chemical unloading operations are attended by an operator who initiates chemical containment, recovery, or cleanup operations in the event of a spill outside of the diked area.

TABLE 7.3-1

EXPECTED STORAGE OF HAZARDOUS MATERIALS

Material	Number of Tanks	Size (gal)	Total Storage (gal)	Expected Containment
Fuel oil				
Diesel generator	4	105,000	420,000	Below ground in concrete vault and adjacent to diesel generator buildings
Auxiliary boiler	1	225,000	225,000	Diked to contain 100% volume of tank
Gasoline	1	5,000	5,000	Below ground
Waste oil	4	10,000	40,000	Diked to contain 100% volume of all tanks in diked area
Circuit breaker insulating oil	36	530	19,000	No control planned
Transformer oil	40	36,000(max)	464,000	Diked to contain 100% of largest transformer
Ammonia	2	2,000	4,000	Curbed area indoors
Hydrazine	Drum storage	55	550	Curbed area indoors
Caustic (50%)	2	6,000	12,000	Curbed area indoors
Sodium hypochlorite (8%)	2	10,000	20,000	Diked area
Sulfuric acid (93%)	2	6,000	12,000	Curbed area indoors
Sulfuric acid (93%)	2	36,000	72,000	Diked area
Refueling water chemical addition tank-caustic (25%)	2	9,200	18,400	Curbed area indoors

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CHAPTER 8

ECONOMIC AND SOCIAL EFFECTS OF STATION CONSTRUCTION AND OPERATION

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stay. Temporary accommodations include primarily hotels and motels, rental mobile homes, and rental apartments.

Temporary or transient accommodations are not in large supply within several miles of the proposed station. Relative to more populated counties and areas that draw a substantial number of tourists, there are few hotel/motel accommodations in Oswego County. Table 8.2-9 reflects the availability of hotel/motel rooms for construction workers under a "worst case" analysis, using peak summer occupancy rates reported by these facilities[1]. Individual operators of lodges in the area suggest that the actual number of vacant rooms that would be available to station workforce will be higher than peak rates indicate and it is thus assumed that average annual vacancy rates are more accurate. Individual operators voiced a preference for construction workers as customers due to the predictability and length of their stays. In addition, the few facilities currently open only during the summer months would be made available year round, given the increase in demand created by the influx of the station workforce[1]. Based on this information, the average annual vacancy rate for Oswego County is estimated at 25 percent higher than an assumed peak summer rate of 10 percent. Since most workers are likely to "double up" in the 190 available rooms based on an occupancy rate of 25 percent for 760 total rooms in Oswego County, 380 manual employees are expected to find hotel/motel accommodations in Oswego County at peak construction (Table 8.2-9). Doubling up is likely given that the average maximum occupancy (capacity) of area hotels/motels is estimated by local operators at 2.5 persons per room. Union officials have further indicated that this is a common practice for construction workers residing in transient accommodations. It is estimated that an additional 150 hotel/motel rooms, space for 300 workers, will be rented in northern Onondaga County, Oneida County or southern Jefferson County due to individual preferences on price or location. The longer commuting distance from accommodations in these counties will tend to discourage some from locating there in favor of other accommodations in Oswego County. However, these 150 rooms are well within the 1.5 hr commute that is common practice for workforce temporarily committed to similar projects according to local labor union officials (Section 8.1.2.2.1).

Manual workers who move into area transient accommodations will impact local housing by displacing other transients. As a result of year-round workforce inmigration, vacancy rates for hotel/motel accommodations, particularly for tourists in the peak summer months will be reduced. As Table 8.2-9 indicates, occupancy in Oswego County motels may run as high as 90-100 percent in July and August. Assuming construction workers will reside in many of these accommodations for a period which includes this season, some tourists may be displaced into other areas (see Section 8.2.2.9 for further discussion of possible impacts upon tourism/recreation).

Additional accommodations will be made available in rental mobile home parks. Those spaces already in place and available for occupancy will be chosen first. An estimated 2,000 of the approximately 5,000 mobile homes in Oswego County are in trailer parks; others are assumed to be privately owned, and not available. Because mobile homes are generally more frequently used as permanent residences in Oswego County than elsewhere, the local proportion of

units available for rental is assumed to be low. There is, however, a 5 to 10-percent vacancy rate (i.e., available spaces) in mobile home parks. The rental units and vacant spaces in mobile home parks amount to about 10 percent of the total of mobile homes in parks, or about 200 homes. If workers double up in these accommodations, there would be space for another 400 workers. Current trends indicate that mobile homes will be available primarily in southern Oswego county. The Town of West Monroe, for example, which borders Onondaga County, had 45 percent of its 1970 housing stock as mobile units. Mobile home rentals in Onondaga, Oneida, and Jefferson Counties will also be available. Assuming that construction workers are willing to commute the greater distance from mobile homes in these counties, an estimated 150 workers will be living in rental mobile homes in Onondaga County.

Rental units in conventional housing will also be available. Current data, as presented in Table 8.2-10, indicate about 80 vacant rental units in Oswego County and another 152 in the Syracuse area including northern Onondaga County. It is conservatively assumed that 50 percent of the available rental units, or 116, will be rented to construction workers. If workers double up, these units will provide accommodations for 232 workers.

Because construction workers are relatively well paid, and because some also receive a travel allowance, they will be able to bid fairly rigorously for the available supply of rental units. Given a limited supply of transient accommodations in Oswego County, however, it will be common for construction workers to often "double up" where capacities permit.

As vacancy rates of all transient accommodations in the county are reduced, some inflation of rental prices may be expected. To the extent that demand for these accommodations in Oswego County is lessened by the availability of others, both within and outside the county, rates will remain competitive. Long term lease pricing for units near the site will experience a moderate and rapid increase as station construction advances, enduring through the peak year of 1989.

The construction of additional housing to accommodate temporary worker demand would be a further impact on the local housing stock. Speculative housing development and new construction of local motor lodges is a potential response to tight transient housing conditions in the site vicinity.

Estimates of occupancy in existing accommodations - hotel/motel (680), rental apartment (232), and rental mobile home units (550) - identify accommodations for approximately 1,462 of the 1,741 manual workforce commuters. Of these workers, 860 are projected to locate in Oswego County, filling the minimum estimated capacity of existing transient accommodations there. The unmet demand represented by the remaining approximately 280 workers is likely to be filled in several ways. First, an increase in transient accommodation will occur as a result of expected population growth in the region between 1978 and the time of construction (Section 2.1.2). Development of new housing responding to demands of manual workers, as discussed above, may supplement this normal growth. Further, accommodations which housed construction workers

for the proposed Sterling Plant will become available as activities on that facility are completed. No significant competition for accommodations will

TABLE 3.5B-1

POTENTIAL ANNUAL POPULATION DOSE REDUCTIONS

	Augment (liquid)	Dose Reduction (man-rem/yr-unit) Thyroid	Total Body
AUG-1	90% efficient demineralizer to the last effluent release stream	5.4E+00	4.1E+00

TABLE 3.5B-2

COST-BENEFIT OF POTENTIAL AUGMENTS

Augment (liquid)	Total Annualized Cost ($)	Point of Diminishing Cost-Benefits Return ($ annually)		Cost-Benefit Ratio	
		Thyroid	Total Body	Thyroid	Total Body
Aug-1 90% efficient demineralizer to the last effluent release stream	27,000	5,400	4,100	5.0	6.59

TABLE 3.5B-3

BASE CASE ANNUAL POPULATION DOSES DUE TO LIQUID EFFLUENT
TOTAL DOSE FROM ALL EXISTING PATHWAYS (MANREM/YR/UNIT)

Pathway	Total Body Dose (manrem)	Total Thyroid Dose (man-thyroid-rem)
Ingestion of Potable Water	1.8E+00	7.0E+00
Ingestion of Fish	5.4E+00	2.4E+00
Shoreline Recreation	1.2E-01	1.2E-01
Swimming	6.2E-05	6.2E-05
Boating	8.6E-04	8.6E-04
TOTAL	7.3E+00	9.5E+00

TABLE 3.5B-4

TOTAL POPULATION DOSES DUE TO GASEOUS RELEASES

Pathway	Total Body Dose (manrem)	Total Thyroid Dose (man-thyroid-rem)
Submersion	2.0E-02	2.0E-02
Inhalation	1.7E-01	3.2E-01
Standing on Contaminated Ground	6.4E-01	6.4E-01
Ingestion of Fruits, Grains, and Vegetation	9.5E-02	3.6E-01
Ingestion of Cow Milk	1.3E-01	5.0E-01
Ingestion of Meat	9.7E-03	1.1E-02
TOTAL	1.1E+00	1.9E+00

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TABLE 5.2A-2

DILUTION FACTORS, POPULATION SERVED, AND TRAVEL TIMES FROM THE SITE

Public Water Systems*	Approximate Distance From Site to Point of Intake (mi)	Dilution Factor	Population Served (people/yr)	Transit Time to Intake (hr)
Oswego City**	11 W	249	26,000	79
Metropolitan Water Board	11 W (same intake as Oswego)	249	67,000	79
Wolcott Village	32 WSW	414	2,500	224
Sackets Harbor Village	33 NNE	298	1,200	179
Sodus Point Village	39 WSW	456	2,000 (4,000 (summer))	272
Chaumont Village	39 NNE	323	550	212
Sodus Village	42 WSW	473	1,800	293
Cape Vincent Village	43 NNE	339	750	234
Williamson Water District	47 WSW	500	5,900	328
Kingston Water Intake Plant, Kingston, Ontario	50 N	366	74,000	272
Kingston Township	50 NNW	366	19,000	272

Incremental Regions*** (mi)	Approximate Distance from Site to Point of Analysis (mi)	Dilution Factor	Population Usage (people/yr) Boating	Population Usage (people/yr) Recreation Shoreline	Transit Time to Point of Analysis (hr)
0 to 10	5	120	3.7E+04	2.4E+05	27
10 to 20	15	202	3.7E+04	2.4E+05	82
20 to 30	25	260	3.7E+04	2.4E+05	136
30 to 40	35	306	3.7E+04	2.4E+05	190
40 to 50	45	347	3.7E+04	2.4E+05	244

TABLE 5.2A-2 (Cont'd)

Public Beaches****	Approximate Distance From Site to Point of Analysis (mi)	Dilution Factor	Population Usage (annual attendance)	Transit Time to Point of Analysis (hr)
Green Point	11.0	174	6,510	60
Sandy Pond Beach	10.5	170	26,215	57
Sandy Pond Beach Inc.	10.0	166	7,245	54
Dowie Dale Beach	2.0	80	6,510	11
Brennan Beach	7.5	145	7,455	49
Rainbow Shores	9.0	158	7,560	49
Chedmardo Farms	5.0	120	8,085	27
White Sands Beach	9.0	158	10,675	49
Chedmardo Trailer Camp	5.5	125	10,675	30
Selkirk Shores St. Park	6.0	130	10,675	33
Fairhaven Beach St. Park	23.0	352	21,035	161
C. Phil Haven Trailer Park	24.5	363	8,575	171
Fair Haven Boathouse	25.0	366	6,510	175
Idlewild on the Lake	40.5	464	8,050	283
Association Island	28.0	274	3,535	152
Wescott Beach St. Park	34.0	302	17,045	185
Dels Bayside Marina	37.0	315	4,095	201
Shangri-La	34.0	302	3,710	185
Isthmus Marina	34.0	302	13,090	185
Willow Shores Trailer Park	46.0	351	3,815	250
Warrens Cottages	47.5	356	3,815	258
Sunset Trailer Park	47.0	354	3,535	255

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FORM APPROVED
OMB No. 158-R0100

FOR AGENCY USE

STANDARD FORM C – MANUFACTURING AND COMMERCIAL

SECTION II. BASIC DISCHARGE DESCRIPTION

Complete this section for **each** discharge indicated in Section I, Item 9, that is to surface waters. This includes discharges to municipal sewerage systems in which the wastewater does not go through a treatment works prior to being discharged to surface waters. Discharges to wells must be described where there are also discharges to surface waters from this facility. **SEPARATE DESCRIPTIONS OF EACH DISCHARGE ARE REQUIRED EVEN IF SEVERAL DISCHARGES ORIGINATE IN THE SAME FACILITY.** All values for an existing discharge should be representative of the twelve previous months of operation. If this is a proposed discharge, values should reflect best engineering estimates.

ADDITIONAL INSTRUCTIONS FOR SELECTED ITEMS APPEAR IN SEPARATE INSTRUCTION BOOKLET AS INDICATED. REFER TO BOOKLET BEFORE FILLING OUT THESE ITEMS.

1. **Discharge Serial No. and Name**
   a. **Discharge Serial No.** (see instructions) — 201a — 001
   b. **Discharge Name** Give name of discharge, if any. (see instructions) — 201b — Combined Station Effluent
   c. **Previous Discharge Serial No.** If previous permit application was made for this discharge (see Item 4, Section I), provide previous discharge serial number. — 201c — Not Applicable (N/A)

2. **Discharge Operating Dates**
   a. **Discharge Began Date** If the discharge described below is in operation, give the date (within best estimate) the discharge began. — 202a — N/A (YR MO)
   b. **Discharge to Begin Date** If the discharge has never occurred but is planned for some future date, give the date (within best estimate) the discharge will begin. — 202b — 1991 (YR) 5 (MO) Unit 1; 1993 (Yr) 5 (Mo) Unit 2
   c. **Discharge to End Date** If discharge is scheduled to be discontinued within the next 5 years, give the date (within best estimate) the discharge will end. — 202c — N/A (YR MO)

3. **Engineering Report Available** Check if an engineering report is available to reviewing agency upon request. (see instructions) — 203 — ☒ See Joint Environmental Report submitted to NRC and PSC

4. **Discharge Location** Name the political boundaries within which the point of discharge is located.

				Agency Use
State	204a	New York	204d	
County	204b	Oswego	204e	
(if applicable) City or Town	204c	New Haven	204f	

5. **Discharge Point Description** Discharge is into (check one): (see instructions)
   - Stream (includes ditches, arroyos, and other intermittent watercourses) — 205a — ☐ STR
   - Lake — ☒ LKE
   - Ocean — ☐ OCE
   - Municipal Sanitary Wastewater Transport System — ☐ MTS
   - Municipal Combined Sanitary and Storm Transport System — ☐ MCS

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EPA Form 7550-23 (7-73)

This section contains 9 pages.

DISCHARGE SERIAL NUMBER

001

FOR AGENCY USE

Municipal Storm Water Transport System		☐ STS
Well (Injection)		☐ WEL
Other		☐ OTH
If 'other' is checked, specify	205b	
6. Discharge Point — Lat/Long Give the precise location of the point of discharge to the nearest second.		NYS Grid Coordinates: N1283250 E569250
Latitude	206a	43 DEG 31 MIN 17.5 SEC
Longitude	206b	76 DEG 19 MIN 20.1 SEC
7. Discharge Receiving Water Name Name the waterway at the point of discharge.(see instructions)	207a	Lake Ontario (USGS Quadrangle for Texas, NY)
If the discharge is through an outfall that extends beyond the shoreline or is below the mean low water line, complete Item 8.	207b	For Agency Use: Major / Minor / Sub; 207c; For Agency Use: 303e
8. Offshore Discharge		
a. **Discharge Distance from Shore**	208a	2800 feet
b. **Discharge Depth Below Water Surface**	208b	20 feet Based on USLS 1935 datum (244.03 ft)
9. Discharge Type and Occurrence		
a. **Type of Discharge** Check whether the discharge is continuous or intermittent. (see instructions)	209a	☒ (con) Continuous ☐ (int) Intermittent
b. **Discharge Occurrence Days per Week** Enter the average number of days per week (during periods of discharge) this discharge occurs.	209b	7 days per week
c. **Discharge Occurrence — Months** If this discharge normally operates (either intermittently, or continuously) on less than a year-around basis (excluding shutdowns for routine maintenance), check the months during the year when the discharge is operating. (see instructions)	209c	☐ JAN ☐ FEB ☐ MAR ☐ APR ☐ MAY ☐ JUN ☐ JUL ☐ AUG ☐ SEP ☐ OCT ☐ NOV ☐ DEC N/A
Complete items 10 and 11 if "intermittent" is checked in Item 9.a. Otherwise, proceed to Item 12.		
10. Intermittent Discharge Quantity State the average volume per discharge occurrence in thousands of gallons.	210	N/A thousand gallons per discharge occurrence.
11. Intermittent Discharge Duration and Frequency		
a. **Intermittent Discharge Duration Per Day** State the average number of hours per day the discharge is operating.	211a	N/A hours per day
b. **Intermittent Discharge Frequency** State the average number of discharge occurrences per day during days when discharging.	211b	N/A discharge occurrences per day
12. Maximum Flow Period Give the time period in which the maximum flow of this discharge occurs.	212	From Dec (month) to Mar (month)

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FORM APPROVED
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FOR AGENCY USE

STANDARD FORM C – MANUFACTURING AND COMMERCIAL

SECTION II. BASIC DISCHARGE DESCRIPTION

Complete this section for **each** discharge indicated in Section I, Item 9, that is to surface waters. This includes discharges to municipal sewerage systems in which the wastewater does not go through a treatment works prior to being discharged to surface waters. Discharges to wells must be described where there are also discharges to surface waters from this facility. **SEPARATE DESCRIPTIONS OF EACH DISCHARGE ARE REQUIRED EVEN IF SEVERAL DISCHARGES ORIGINATE IN THE SAME FACILITY.** All values for an existing discharge should be representative of the twelve previous months of operation. If this is a proposed discharge, values should reflect best engineering estimates.

ADDITIONAL INSTRUCTIONS FOR SELECTED ITEMS APPEAR IN SEPARATE INSTRUCTION BOOKLET AS INDICATED. REFER TO BOOKLET BEFORE FILLING OUT THESE ITEMS.

1. **Discharge Serial No. and Name**
   a. **Discharge Serial No.** (see instructions) — **201a** 002
   b. **Discharge Name** Give name of discharge, if any. (see instructions) — **201b** Temporary Sediment Detention Basin Effluent
   c. **Previous Discharge Serial No.** If previous permit application was made for this discharge (see Item 4, Section I), provide previous discharge serial number. — **201c** Not Applicable (N/A)

2. **Discharge Operating Dates**
   a. **Discharge Began Date** If the discharge described below is in operation, give the date (within best estimate) the discharge began. — **202a** N/A (YR MO)
   b. **Discharge to Begin Date** If the discharge has never occurred but is planned for some future date, give the date (within best estimate) the discharge will begin. — **202b** 82 (YR) 4 (MO) See additional information - Item 202b
   c. **Discharge to End Date** If discharge is scheduled to be discontinued within the next 5 years, give the date (within best estimate) the discharge will end. — **202c** 93 (YR) 5 (MO) See additional information - Item 202c

3. **Engineering Report Available** Check if an engineering report is available to reviewing agency upon request. (see instructions) — **203** ☒ See Joint Environmental Report submitted to NRC and PSC

4. **Discharge Location** Name the political boundaries within which the point of discharge is located.

				Agency Use
State	204a	New York	204d	
County	204b	Oswego	204e	
(if applicable) City or Town	204c	New Haven	204f	

5. **Discharge Point Description** Discharge is into (check one): (see instructions)
   - Stream (includes ditches, arroyos, and other intermittent watercourses) — **205a** ☒ STR
   - Lake ☐ LKE
   - Ocean ☐ OCE
   - Municipal Sanitary Wastewater Transport System ☐ MTS
   - Municipal Combined Sanitary and Storm Transport System ☐ MCS

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DISCHARGE SERIAL NUMBER

002

FOR AGENCY USE

Municipal Storm Water Transport System		☐ STS
Well (Injection)		☐ WEL
Other		☐ OTH
If 'other' is checked, specify	205b	
6. Discharge Point — Lat/Long Give the precise location of the point of discharge to the nearest second.		NYS Grid Coordinates:
Latitude	206a	43 DEG 29 MIN 14.5 SEC — N 1270810
Longitude	206b	76 DEG 18 MIN 8.7 SEC — E 574550
7. Discharge Receiving Water Name Name the waterway at the point of discharge.(see instructions)	207a	Unnamed tributary of Catfish Creek (USGS quadrangle for New Haven, NY)
If the discharge is through an outfall that extends beyond the shoreline or is below the mean low water line, complete Item 8.	207b	For Agency Use: Major / Minor / Sub; 207c; For Agency Use: 303e
8. Offshore Discharge		
a. **Discharge Distance from Shore**	208a	N/A feet
b. **Discharge Depth Below Water Surface**	208b	N/A feet
9. Discharge Type and Occurrence		
a. **Type of Discharge** Check whether the discharge is continuous or intermittent. (see instructions)	209a	☐ (con) Continuous ☒ (int) Intermittent See additional information, Item 209
b. **Discharge Occurrence Days per Week** Enter the average number of days per week (during periods of discharge) this discharge occurs.	209b	___ days per week See additional information Item 209
c. **Discharge Occurrence —Months** If this discharge normally operates (either intermittently, or continuously) on less than a year-around basis (excluding shutdowns for routine maintenance), check the months during the year when the discharge is operating. (see instructions)	209c	☐ JAN ☐ FEB ☐ MAR ☐ APR ☐ MAY ☐ JUN ☐ JUL ☐ AUG N/A ☐ SEP ☐ OCT ☐ NOV ☐ DEC
Complete Items 10 and 11 if "intermittent" is checked in Item 9.a. Otherwise, proceed to item 12.		
10. Intermittent Discharge Quantity State the average volume per discharge occurrence in thousands of gallons.	210	___ thousand gallons per discharge occurrence. See additional information, Item 210
11. Intermittent Discharge Duration and Frequency		
a. **Intermittent Discharge Duration Per Day** State the average number of hours per day the discharge is operating.	211a	___ hours per day See additional information, Item 210
b. **Intermittent Discharge Frequency** State the average number of discharge occurrences per day during days when discharging.	211b	___ discharge occurrences per day See additional information, Item 210
12. Maximum Flow Period Give the time period in which the maximum flow of this discharge occurs.	212	From ___ (month) to ___ (month) See additional information, Item 210

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DISCHARGE SERIAL NUMBER

002

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FOR AGENCY USE

16. Wastewater Characteristics

Check the box beside each constituent which is present in the effluent (discharge water). This determination is to be based on actual analysis or best estimate.(see instructions)

Parameter 216	Present	Parameter 216	Present
Color 00080		Copper 01042	
Ammonia 00610		Iron 01045	
Organic nitrogen 00605		Lead 01051	
Nitrate 00620		Magnesium 00927	
Nitrite 00615		Manganese 01055	
Phosphorus 00665		Mercury 71900	
Sulfate 00945		Molybdenum 01062	
Sulfide 00745		Nickel 01067	
Sulfite 00740		Selenium 01147	
Bromide 71870		Silver 01077	
Chloride 00940		Potassium 00937	
Cyanide 00720		Sodium 00929	
Fluoride 00951		Thallium 01059	
Aluminum 01105		Titanium 01152	
Antimony 01097		Tin 01102	
Arsenic 01002		Zinc 01092	
Beryllium 01012		Algicides* 74051	
Barium 01007		Chlorinated organic compounds* 74052	
Boron 01022		Pesticides* 74053	
Cadmium 01027		Oil and grease 00550	
Calcium 00916		Phenols 32730	
Cobalt 01037		Surfactants 38260	
Chromium 01034		Chlorine 50060	
Fecal coliform bacteria 74055		Radioactivity* 74050	

*Specify substances, compounds and/or elements in Item 26.

Pesticides (insecticides, fungicides, and rodenticides) must be reported in terms of the acceptable common names specified in *Acceptable Common Names and Chemical Names for the Ingredient Statement on Pesticide Labels,* 2nd Edition, Environmental Protection Agency, Washington, D.C. 20250, June 1972, as required by Subsection 162.7(b) of the Regulations for the Enforcement of the Federal Insecticide, Fungicide, and Rodenticide Act.

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DISCHARGE SERIAL NUMBER
002

FOR AGENCY USE

17. Description of Intake and Discharge

For each of the parameters listed below, enter in the appropriate box the value or code letter answer called for.(see instructions)

In addition, enter the parameter name and code and all required values for any of the following parameters if they were checked in Item 16; ammonia, cyanide, aluminum, arsenic, beryllium, cadmium, chromium, copper, lead, mercury, nickel, selenium, zinc, phenols, oil and grease, and chlorine (residual).

See additional information

Parameter and Code 217a	Influent		Effluent					
	Untreated Intake Water (Daily Average) (1)	In-Plant Treated Intake Water (Daily Average) (2)	Daily Average (3)	Minimum Value Observed or Expected During Discharge Activity (4)	Maximum Value Observed or Expected During Discharge Activity (5)	Frequency of Analysis (6)	Number of Analyses (7)	Sample Type (8)
Flow* Gallons per day 00056	3200 (1)	N/A	3200 (1)	0	7.5 mil gallons (2)	N/A	N/A	N/A
pH Units 00400	N/A	N/A	X	N/A	N/A	N/A	N/A	N/A
Temperature (winter) °F 74028	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Temperature (summer) °F 74027	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Biochemical Oxygen Demand (BOD 5-day) mg/l 00310	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Chemical Oxygen Demand (COD) mg/l 00340	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total Suspended (nonfilterable) Solids mg/l 00530	N/A	N/A	30	N/A	50	1 (3)	N/A	G
Specific Conductance micromhos/cm at 25° C 00095	N/A	N/A	X	N/A	N/A	N/A	N/A	N/A
Settleable Matter (residue) ml/l 00545	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

*Other discharges sharing intake flow (serial numbers).(see instructions)

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DISCHARGE SERIAL NUMBER

002

FOR AGENCY USE

26. Additional Information

226

Item	Information
202b	Approximate date for start of plant construction
202c	Approximate date for startup of Unit 2 and completion of construction
209	Stormwater runoff is weather dependent. Carbon filter backwash will occur approximately once per day during peak usage. Water from excavation dewatering is dependent upon weather and soil conditions.
210	Carbon filter backwash will be approximately 3200 gallons per day during peak usage and will be discharged to the sediment detention basin over a 30-minute time period. The amount or frequency of discharge to the sediment detention basin of water from excavation dewatering cannot be predicted because it will vary with the weather and soil conditions. Stormwater runoff will be variable dependent upon weather conditions. Volume will vary up to a maximum of 7.5 million gallons which will be discharged over a maximum period of five days.
217a(1)	3200 gallons is the anticipated maximum volume of the carbon filter backwash. The volume of stormwater runoff and excavation dewatering will be variable dependent upon weather and soil conditions.
217a(2)	7.5 million gallons is the maximum capacity of the sediment detention basin, which will be discharged in five days.
217a(3)	Grab sample will be taken and analyzed during discharge from sediment detention basin.

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STANDARD FORM C – MANUFACTURING AND COMMERCIAL

FOR AGENCY USE

SECTION II. BASIC DISCHARGE DESCRIPTION

Complete this section for **each** discharge indicated in Section I, Item 9, that is to surface waters. This includes discharges to municipal sewerage systems in which the wastewater does not go through a treatment works prior to being discharged to surface waters. Discharges to wells must be described where there are also discharges to surface waters from this facility. **SEPARATE DESCRIPTIONS OF EACH DISCHARGE ARE REQUIRED EVEN IF SEVERAL DISCHARGES ORIGINATE IN THE SAME FACILITY.** All values for an existing discharge should be representative of the twelve previous months of operation. If this is a proposed discharge, values should reflect best engineering estimates.

ADDITIONAL INSTRUCTIONS FOR SELECTED ITEMS APPEAR IN SEPARATE INSTRUCTION BOOKLET AS INDICATED. REFER TO BOOKLET BEFORE FILLING OUT THESE ITEMS.

1. **Discharge Serial No. and Name**
   a. **Discharge Serial No.** (see instructions) — **201a** 003
   b. **Discharge Name** Give name of discharge, if any. (see instructions) — **201b** Temporary Construction Sanitary Effluent
   c. **Previous Discharge Serial No.** If previous permit application was made for this discharge (see Item 4, Section I), provide previous discharge serial number. — **201c** Not Applicable (N/A)

2. **Discharge Operating Dates**
   a. **Discharge Began Date** If the discharge described below is in operation, give the date (within best estimate) the discharge began. — **202a** N/A (YR) ___ (MO)
   b. **Discharge to Begin Date** If the discharge has never occurred but is planned for some future date, give the date (within best estimate) the discharge will begin. — **202b** 1984 (YR) ___ (MO) See additional information, Item 202b
   c. **Discharge to End Date** If discharge is scheduled to be discontinued within the next 5 years, give the date (within best estimate) the discharge will end. — **202c** 1991 (YR) ___ (MO) See additional information, Item 202c

3. **Engineering Report Available** Check if an engineering report is available to reviewing agency upon request. (see instructions) — **203** ☒ See Joint Environmental Report submitted to PSC and NRC

4. **Discharge Location** Name the political boundaries within which the point of discharge is located.

					Agency Use
State	**204a**	New York	**204d**	
County	**204b**	Oswego	**204e**	
(if applicable) City or Town	**204c**	New Haven	**204f**	

5. **Discharge Point Description** Discharge is into (check one): (see instructions)

Stream (includes ditches, arroyos, and other intermittent watercourses)	**205a**	☐ STR
Lake		☒ LKE
Ocean		☐ OCE
Municipal Sanitary Wastewater Transport System		☐ MTS
Municipal Combined Sanitary and Storm Transport System		☐ MCS

DISCHARGE SERIAL NUMBER

003

FOR AGENCY USE

Municipal Storm Water Transport System ☐ STS

Well (Injection) ☐ WEL

Other ☐ OTH

If 'other' is checked, specify — 205b

6. **Discharge Point — Lat/Long** Give the precise location of the point of discharge to the nearest second.

Latitude — 206a — 43 DEG 31 MIN 13 SEC

Longitude — 206b — 76 DEG 18 MIN 59.8 SEC

NYS Grid Coordinates:
N 1282800
E 570750

7. **Discharge Receiving Water Name** Name the waterway at the point of discharge (see instructions) — 207a — Lake Ontario (USGS New Haven Quadrangle)

If the discharge is through an outfall that extends beyond the shoreline or is below the mean low water line, complete Item 8.

207b — For Agency Use

Major	Minor	Sub

207c

For Agency Use

303e

8. **Offshore Discharge**

a. **Discharge Distance from Shore** — 208a — 1800 feet

b. **Discharge Depth Below Water Surface** — 208b — 16 feet Based on USLS 1935 datum (244.03 ft)

9. **Discharge Type and Occurrence**

a. **Type of Discharge** Check whether the discharge is continuous or intermittent. (see instructions) — 209a

☒ (con) Continuous

☐ (int) Intermittent

b. **Discharge Occurrence Days per Week** Enter the average number of days per week (during periods of discharge) this discharge occurs. — 209b — 7 days per week

c. **Discharge Occurrence — Months** If this discharge normally operates (either intermittently, or continuously) on less than a year-around basis (excluding shutdowns for routine maintenance), check the months during the year when the discharge is operating. (see instructions) — 209c

☐ JAN ☐ FEB ☐ MAR ☐ APR

☐ MAY ☐ JUN ☐ JUL ☐ AUG N/A

☐ SEP ☐ OCT ☐ NOV ☐ DEC

Complete Items 10 and 11 if "intermittent" is checked in Item 9.a. Otherwise, proceed to Item 12.

10. **Intermittent Discharge Quantity** State the average volume per discharge occurrence in thousands of gallons. — 210 — N/A thousand gallons per discharge occurrence.

11. **Intermittent Discharge Duration and Frequency**

a. **Intermittent Discharge Duration Per Day** State the average number of hours per day the discharge is operating. — 211a — N/A hours per day

b. **Intermittent Discharge Frequency** State the average number of discharge occurrences per day during days when discharging. — 211b — N/A discharge occurrences per day

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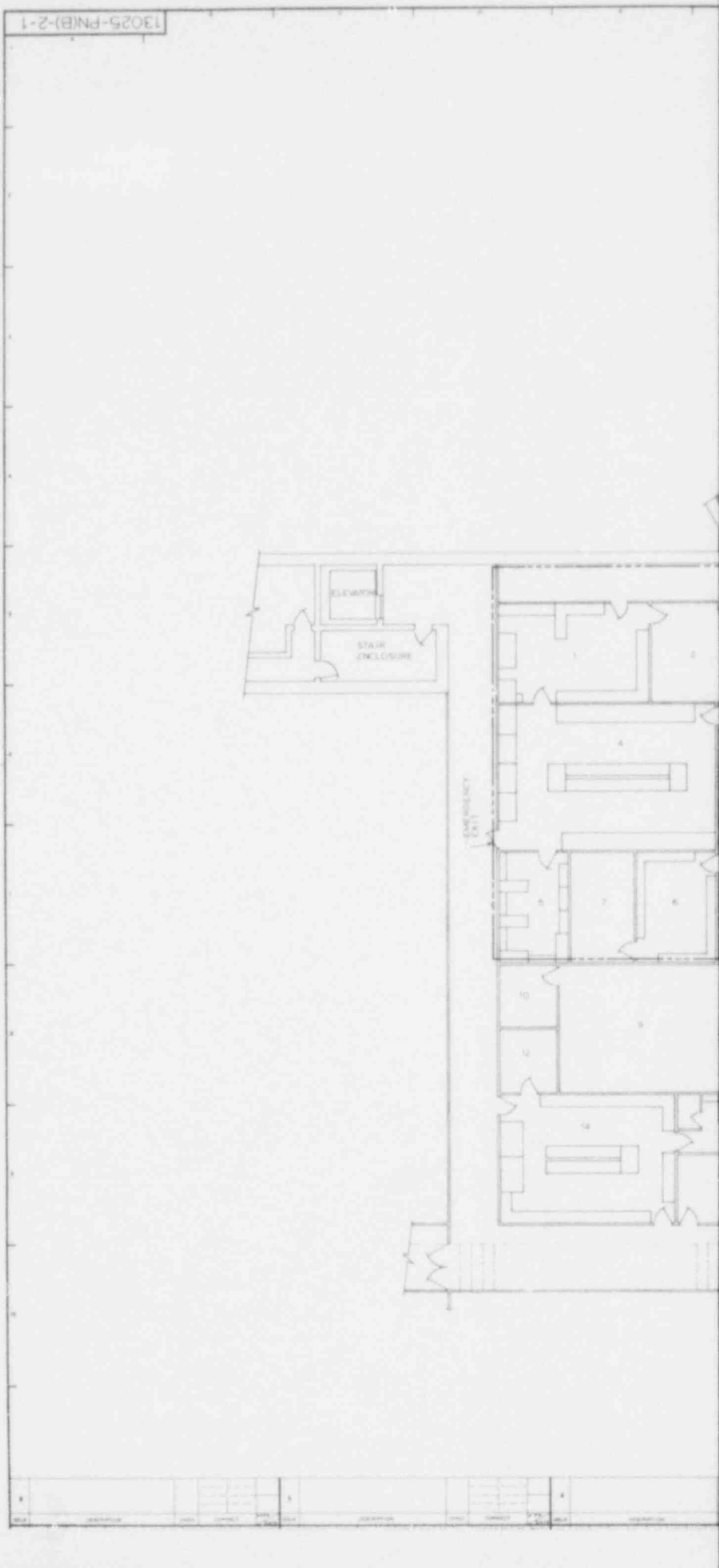
12. **Maximum Flow Period** Give the time period in which the maximum flow of this discharge occurs. — 212 — From N/A (month) to N/A (month)

EPA Form 7550-23 (7-73)

Amendment 3 June 1979



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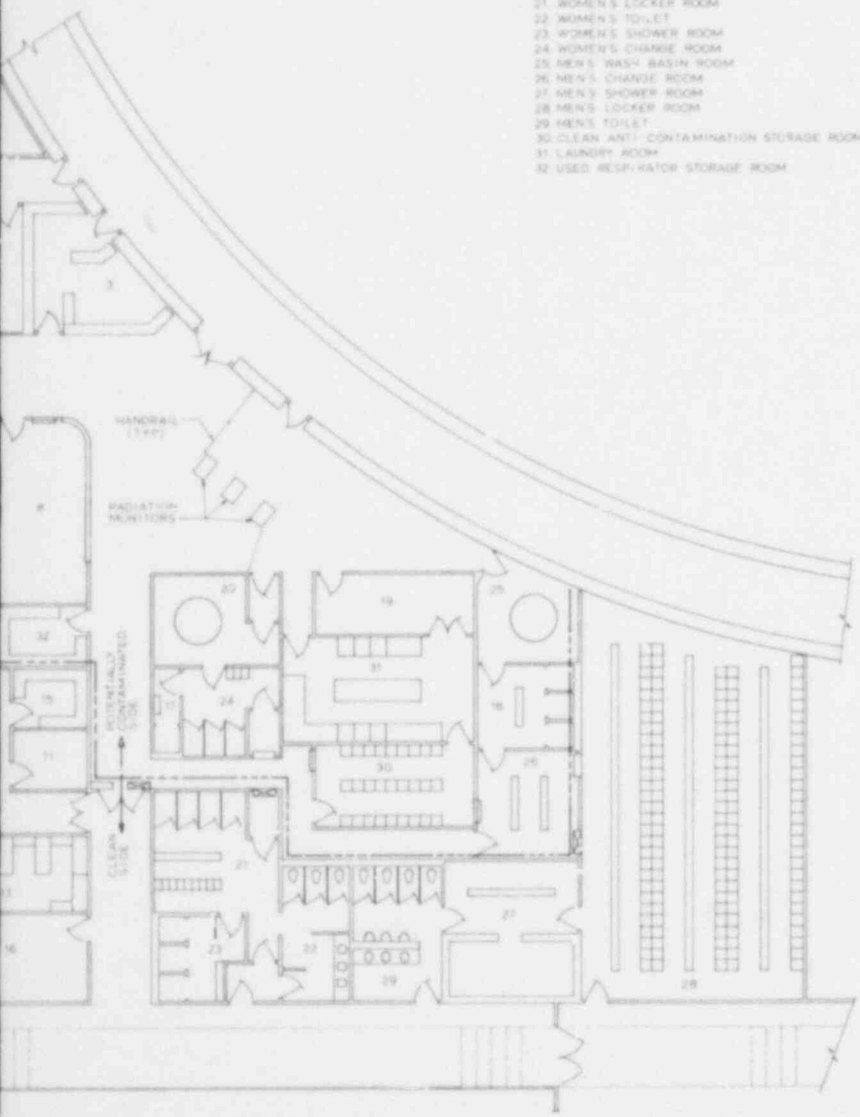
HEALTH PHYSICS AREA DESIGNATION

1. RADIO CHEMISTRY COUNTING ROOM
2. HEALTH PHYSICS COUNTING ROOM
3. RADIO CHEMISTRY SAMPLE STORAGE ROOM
4. RADIO CHEMISTRY LAB
5. RADIO CHEMISTRY WORK ROOM
6. INSTRUMENT STORAGE ROOM
7. HEALTH PHYSICS INSTRUMENT CALIBRATION ROOM
8. HEALTH PHYSICS CONTROL POINT
9. HEALTH PHYSICS WORK ROOM
10. HEALTH PHYSICS STORAGE ROOM
11. HEALTH PHYSICS SUPERVISOR'S OFFICE
12. CHEMISTRY SUPERVISOR'S OFFICE
13. CHEMISTRY WORK ROOM
14. CHEMISTRY LAB
15. RESPIRATOR FIT ROOM
16. WHOLE BODY COUNT & PERSONNEL DOSIMETRY ROOM
17. WOMEN'S DECONTAMINATION ROOM
18. MEN'S DECONTAMINATION ROOM
19. USED ANTI-CONTAMINATION STORAGE ROOM
20. WOMEN'S WASH BASIN ROOM
21. WOMEN'S LOCKER ROOM
22. WOMEN'S TOILET
23. WOMEN'S SHOWER ROOM
24. WOMEN'S CHANGE ROOM
25. MEN'S WASH BASIN ROOM
26. MEN'S CHANGE ROOM
27. MEN'S SHOWER ROOM
28. MEN'S LOCKER ROOM
29. MEN'S TOILET
30. CLEAN ANTI-CONTAMINATION STORAGE ROOM
31. LAUNDRY ROOM
32. USED RESPIRATOR STORAGE ROOM

LEGEND:
- RADIATION MONITOR & CARD CONTROL EGRESS POINT
- CARD CONTROL ACCESS POINT
- PASSTHROUGH WINDOW
- CONTROLLED AREAS

NOTES:
1. SCALE: 1/8" = 1'-0"



PLAN EL 0'-6"

POOR ORIGINAL

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AMENDMENT 1, FEBRUARY 1979

FIGURE 12.1-1
HEALTH PHYSICS AREA

NEW YORK STATE ELECTRIC & GAS
NEW HAVEN NUCLEAR PLANT UNITS 1 & 2

STONE & WEBSTER ENGINEERING CORPORATION
BOSTON, MASS.

DRAWING NUMBER 13025-PN(B)-2-1

X

BECHTEL

NONCONFORMANCE REPORT

S/U Non-testable Unit

1. PROJECT NAME	JOB NO.	19. NO.	20. PAGE
Midland	07220	2150	1 of 4

2. UNIT(S)	3. DRAWING/PART NO.	REV	4. ITEM DESCRIPTION	5. ITEM LOCATION
Cont. # 1	E-656	8	Conduit ~~Suppot~~ Supports	Cont. #1 Col. 3, 635', ±

5. P.O. OR SPEC NO.	7. SERIAL NO.	8. REPLACEMENT PART	9. SOURCE	10. CONTRACTOR/SUPPLIER
N/A	N/A	P/N N/A REV N/A SER NO. N/A	Construction	N/A

11. INSPECTION CRITERIA	12. ASME AUTHORIZED INSPECTION REQ'D	13. SKETCH ATTACHED	14. Discovered During	15. Equip Furnished By
(X) DWG ( ) SPEC ( ) OTHER; IR NO. 1ALC023; NO E-42	( ) YES (X) NO	(X) YES ( ) NO	( ) Rec'g (X) Const ( ) Test	( ) Client ( ) Eng (X) FLD

16. NONCONFORMING CONDITION: There is no approved detail for welding P1001 to the edge of the Flanges of Column #3 to be used as conduit supports, at Two (2) locations.

E

Q-List Number 3.006 Two (2) Hold Tags Applied Hold For Engineering Disposition

17. REPORTED BY: J W Miller DATE: 5-1-79

18. VALIDATED BY: [illegible] DATE: [illegible]

21. ROUTING: (X) TO FIELD ENGINEERING ( ) TO OTHERS (SPECIFY)

22. ( ) Field Engineering Disposition (X) Field Engineering Recommended Disposition to Project Engineering

USE AS IS – THIS CASE ONLY

N.B. Harper 5/15/79

23. PROJECT ENGINEERING DISPOSITION: Project engineering has reviewed and evaluated the nonconforming condition and finds it unacceptable as built. Project Engineering recommends the supports be reworked as support type 550, Dwg. E-42, Sh. 550. See attached sketch.

P. Corbett 5/25/79

24. DISPOSITION CONCURRENCE

rework	reject	repair	use as is
X			

A. Miller 5-29-79 — PROJECT FIELD ENGINEER — DATE

S.R. Bernstein/RLC 5-25-79 — PROJECT ENGINEER — DATE

[illegible] 6-4-79 — PROJ CONSTR QC ENGINEER — DATE

AUTHORIZED INSPECTOR — DATE

25. DISPOSITION RESULTS

CONDUIT SUPPORTS REWORKED IN ACCORDANCE WITH BLOCK 23 AND PAGE 3 OF THIS NCR.

J W Miller 6-26-79

26. QC ACCEPTANCE

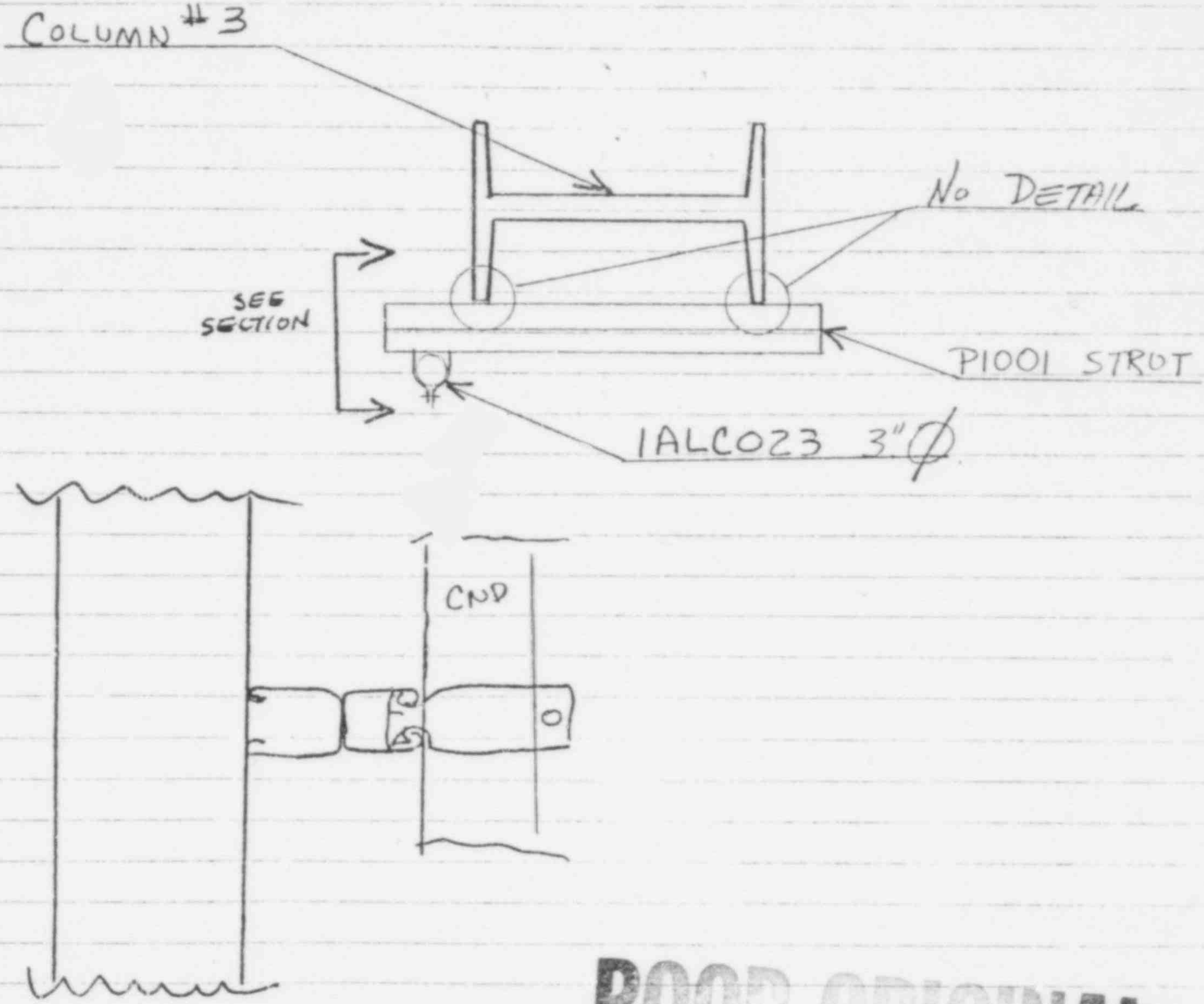
J W Miller 6-26-79 — QC ENGINEER — DATE

AUTHORIZED INSPECTOR — DATE

POOR ORIGINAL

565

E-42



POOR ORIGINAL

CALCULATION SHEET

DATE

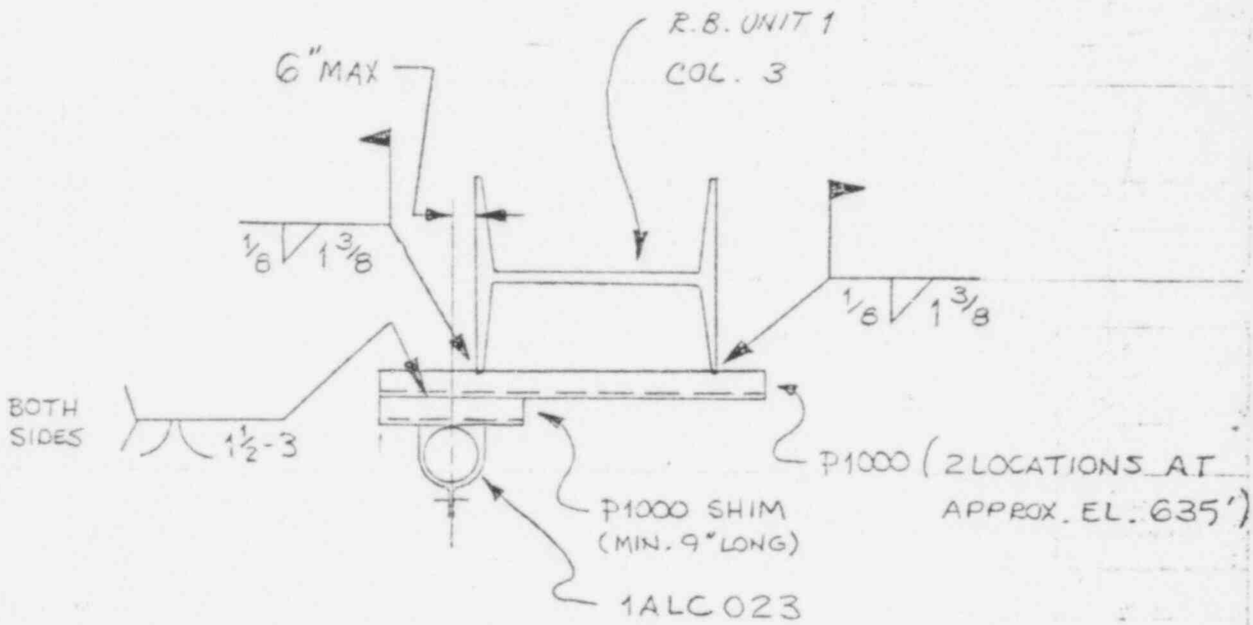
DESIGN BY J. ALEXANDER DATE 5-23-79 CHECKED BY SHEET NO.

PROJECT MIDLAND JOB NO.

SUBJECT SUPPORT NO. 550 CALCULATION NO. FILE NO.

NCR 2150 RESOLUTION:

PROJECT ENGINEERING HAS REVIEWED AND EVALUATED THE NON-CONFORMING CONDITION AND FINDS IT UNACCEPTABLE AS-BUILT. PROJECT ENGINEERING RECOMMENDS THE SUPPORTS BE REWORKED AS SUPPORT TYPE 550, DWG. E-42, SH. 550.



TYPE 550 SUPPORT

NCR 2150
PAGE 3 of 4

MIDLAND PROJECT

RESIDENT ENGINEER MEMORANDUM

RE- E-1669

DATE 5/25/79

SUBJECT: WELDING P1001 TO EDGE OF FLANGE OF COLUMN #3

REF: NCR 2150

AAO COORDINATION: Date 5/25/79 /Time 9:30 /AAO Contact R. HARRISON

PROJECT ENGINEERING HAS EVALUATED THE EXISTING CONDITION AND FINDS IT UNACCEPTABLE AS BUILT. PROJECT ENGINEERING RECOMMENDS THE SUPPORTS BE REWORKED AS SUPPORT TYPE 550 DWG. E-42, SH. 550.

POOR ORIGINAL

NCR 2150
PAGE 4 of 4

RESIDENT ENGINEER P. Corbett
5/25/79

AAO Review: Group Supervisor ______________

Date: ______________

565224
226

Corrected Copy

NONCONFORMANCE REPORT S/U Non-Testable

1. PROJECT NAME: Midland	JOB NO. 7220		19. NO. 2157	20. PAGE 1 OF 12
2. UNIT(S): Common	3. DRAWING/PART NO.: N/A	REV: N/A	4. ITEM DESCRIPTION: Grouting of Anchor Bolts for Wall Hangers	5. ITEM LOCATION: Auxiliary Building
6. P.O. OR SPEC NO.: N/A	7. SERIAL NO.: N/A	8. REPLACEMENT PART P/N N/A REV N/A SER NO. N/A	9. SOURCE: Construction	10. CONTRACTOR/SUPPLIER: N/A
11. INSPECTION CRITERIA ( ) DWG (X) SPEC ( ) OTHER — IR NO. C-1.10-526; NO. C-306, Rev.4	12. ASME AUTHORIZED INSPECTION REQ'D ( ) YES (X) NO	13. SKETCH ATTACHED ( ) YES (X) NO	14. Discovered During ( ) Rec'g (X) Const ( ) Test	15. Equip Furnished By ( ) Client ( ) Eng (X) FLD

16. NONCONFORMING CONDITION: Specification 7220/C-306, Rev. 4, Sect. 7.0 states in part: "Visual inspection of the process of grouting bolts shall be performed to assure correct installation." Contrary to the above, Hanger #(619-6-1) / 26-OHBC-19-H1 located in the East Wing Wall Elevation 596'± (6' E/7.9, 6' S/C) was removed due to relocation. 16 (1" Dia.) grouted anchor bolts were used. When the bolts were cored out, each bolt had a void in the top back portion of each hole. "Q"-List #2.105. Hold for Engineering Disposition. 1 Hold Tag Applied.

17. REPORTED BY: Kathy J Gunser DATE 5/3/79

18. VALIDATED BY: W. Barclay DATE 5-3-79

21. ROUTING: (X) TO FIELD ENGINEERING ( ) TO OTHERS (SPECIFY)

22. (X) Field Engineering Disposition ( ) Field Engineering Recommended Disposition to Project Engineering

Field engineering performed several sample grout tests (see attached field engineer's report.) and believe this to be an isolated case. The above mentioned conditions will be reworked to meet specification C-306. H Betts 6/19/79

23. PROJECT ENGINEERING DISPOSITION

POOR ORIGINAL

24. DISPOSITION CONCURRENCE rework / reject / repair / use as is

J J Delmonte PROJECT FIELD ENGINEER DATE 6/19/79

PROJECT ENGINEER DATE

W Barclay PROJ CONSTR QC ENGINEER DATE 6-22-79

AUTHORIZED INSPECTOR DATE

25. DISPOSITION RESULTS

The other (3) plates of Hanger #619-6-1 were removed & inspected. Small superficial voids were found. The in-process inspection of the cosmetic repair work was witnessed by QC Inspector, K Gunser, on 6/27/79 and documented on the attached Field Inspection Report

26. QC ACCEPTANCE Kathy Gunser QC ENGINEER DATE 6/27/79

AUTHORIZED INSPECTOR DATE

5655

BLOCK 16 CONTINUED:

The above 16 anchors were regrouted. The lower right plate was removed revealing a void in the top portion of the anchor 1/2" High x 3" Deep & 3" Across.

Kathy J Geiser 5/16/79

W.L. Barclay 5/16/79

Corrected Copy

228

NCR 2157

FIELD ENGINEER'S REPORT FORM

MIDLAND UNITS 1 & 2

JOB 7220 DATE 6/12/79 PAGE 1 OF 12

ITEM NO.	INSPECTION DESCRIPTION	ACTION REQUIRED/TAKEN
	DUE TO THE VOIDS REPORTED IN GROUTED ANCHOR BOLTS PER NCR-2157, FIELD ENGINEERING SET UP TYPICAL GROUTING SITUATIONS TO MAKE OBSERVATIONS. THIS WAS ACCOMPLISHED BY SETTING UP A 4'x8' SHEET OF PLYWOOD AS A VERTICAL WALL FACE AND ATTACHING PLEX-IGLASS CYLINDERS TO THE BACK OF PLYWOOD AT DIFFERENT ANGLES WITH BENT OR DOUBLE BENT BOLTS IN THEM. Q.C. GROUTING ENG. & CEMENT FINISHERS GROUTED BOLTS AS THEY WOULD IN FIELD ~~FROM~~ FROM FRONT OF BOARD WHILE FIELD ENGR'G & Q.C. LEAD CIVIL OBSERVED FROM BACK OF BOARD. THERE WAS NO COMMUNICATION BETWEEN GROUPS AS TO STATUS OF GROUTING.	
	THE FOLLOWING RECOMMENDATIONS AND CONCLUSIONS WERE REACHED:	
	① FIVE STAR GROUT IS SATISFACTORY BUT "BLEEDS" WITH SLIGHT VIBRATION FORMING SMALL WATER POCKET @ TOP OF GROUT HOLE.	NCR-2157 p. 3 & 15
	② EMBECO MASTERFLOW 713 GROUT IS BETTER WITH NO "BLEEDING" OBSERVED WITH VIBRATION.	

REMARKS:

565 ~~597~~

229

B. Howard

ROUTE

A. Boos
B. Barclay
S. Kirker
J. Betts
L. Dreisback

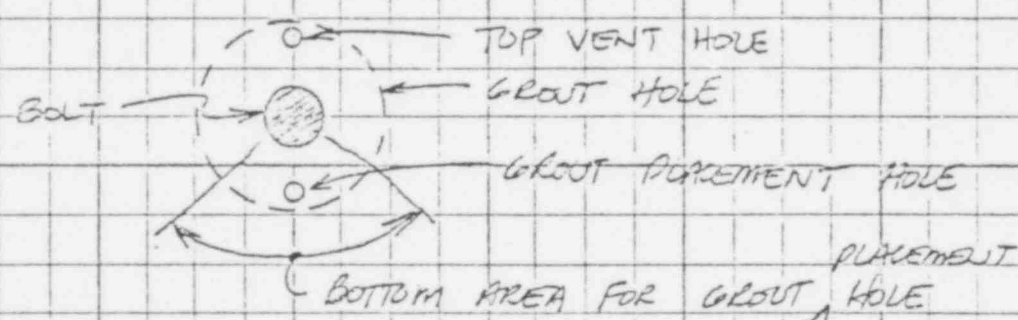
FIELD ENGINEER'S REPORT FORM

MIDLAND UNITS 1 & 2

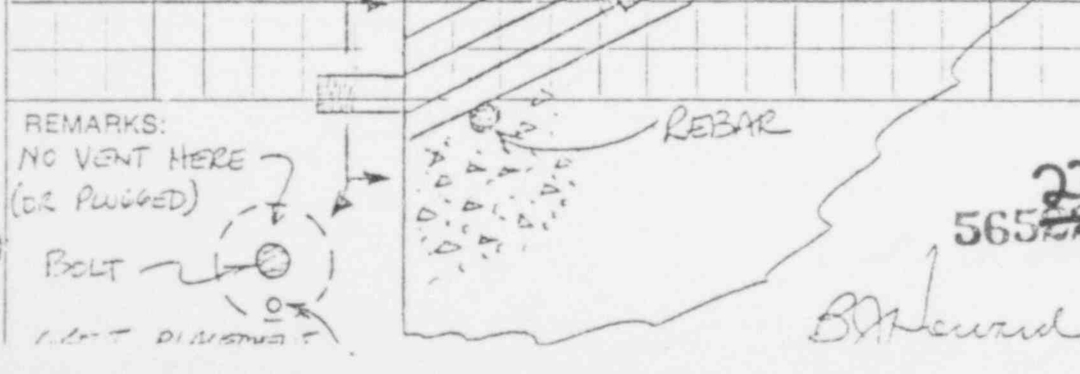
BECHTEL

JOB 7220 DATE 6/12/79

ITEM NO.	INSPECTION DESCRIPTION	ACTION REQUIRED/TAKEN
	③ HAMMERING BOLT ENDS/NUTS HELPS VIBRATE GROUT SLIGHTLY AND ELIMINATE AIR POCKETS THAT TEND TO FORM WHERE NUTS ARE CLOSE TO WALL OF GROUT HOLE.	
	④ GROUT SHOULD BE PLACED FROM BOTTOM AND VENT SHOULD BE OUT TOP — NOT A SIDE VENT (SEE SKETCH).	



⑤ IF HOLE SLOPES UPWARD TO CLEAR REBAR, FIELD ENG'R'G RECOMMENDS THAT A VENT HOLE BE DRILLED TO UPPERMOST POINT OF GROUT HOLE AND THE TOP VENT HOLE OF ITEM ④ BE ELIMINATED OR PLUGGED (SEE SKETCH).



REMARKS:

ROUTE

565230

B. Howard

Pg. 4 of 15
NCR-2157

POOR ORIGINAL

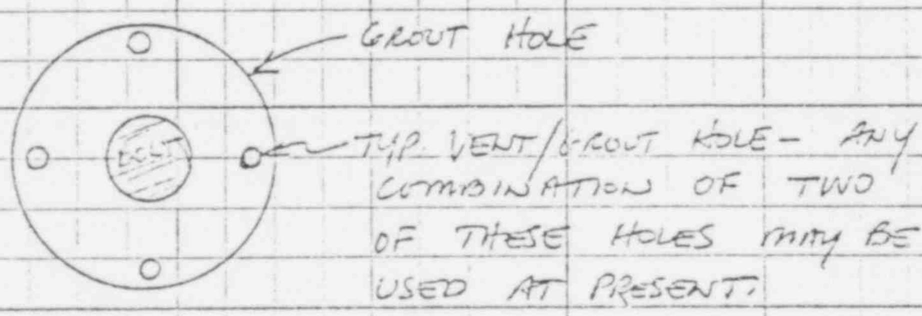
FIELD ENGINEER'S REPORT FORM

BECHTEL

MIDLAND UNITS 1 & 2

JOB 7220 DATE 6/12/79 PAGE 3 OF 12

ITEM NO.	INSPECTION DESCRIPTION	ACTION REQUIRED/TAKEN
	(16) FROM OBSERVATIONS OF GROUTING THE FIELD PROCEDURE APPEARED BASICALLY O.K. FIELD ENGINEERING THEREFORE CONCLUDES THAT NCR 2157 IS AN ISOLATED CASE.	
	(17) PICTURES ARE ATTACHED SHOWING THE RESULTS OF VARIOUS GROUTING CONDITIONS WHICH WERE OBSERVED.	
	NOTE: ALL REFERENCES TO TOP, BOTTOM, OR SIDE HOLES REFERS TO LOCATION OF HOLES TAPPED IN PLATES/WOOD FOR GROUTING & VENTING PURPOSES. SEE BELOW:	



Pg. 5 of 5
NCR-2157

REMARKS:

ROUTE

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565229

RJH [illegible]

CALCULATION SHEET

DATE ____

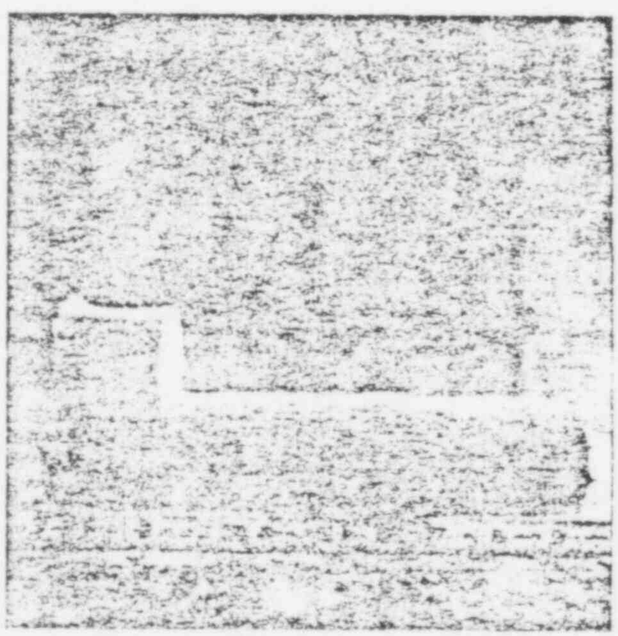
DESIGN BY ____ DATE ____ CHECKED BY ____ SHEET NO. 4/12

PROJECT ____ JOB NO. ____

SUBJECT ____ CALCULATION NO. ____ FILE NO. ____

BOLT #1 - 1 1/8" ϕ BOLT WITH A DOUBLE BEND (sketch) DOWNWARD. FIVE STAR GROUT WAS USED FILLING THRU BOTTOM HOLE. BOLT WAS NOT TAPPED WITH HAMMER TO VIBRATE.

NOTE: THERE WAS SLIGHT "BLEEDING" AT TOP. DUE TO VIBRATION OF 4'x8' PLYWOOD WHILE HAMMERING BOLTS OF OTHER SAMPLES.



#1

Pg. 6 of 15
NCR-2157

CALCULATION SHEET

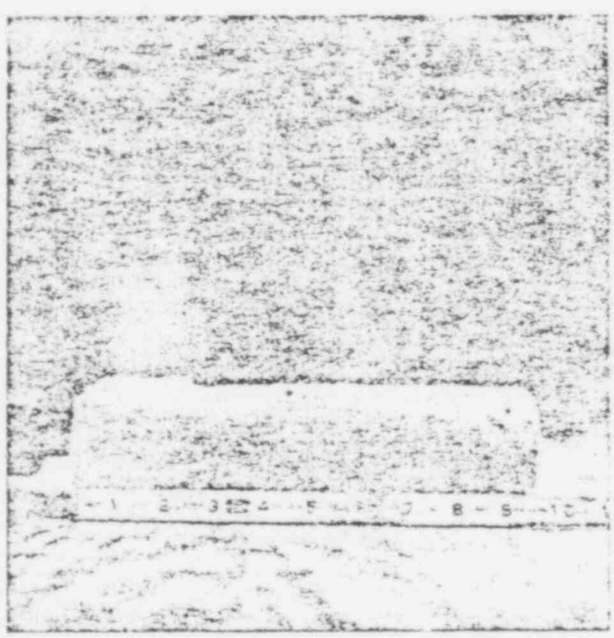
DATE ______

DESIGN BY ______ DATE ______ CHECKED BY ______ SHEET NO. 5/12

PROJECT ______ JOB NO. ______

SUBJECT ______ CALCULATION NO. ______ FILE NO. ______

BOLT #2 – 1 1/8" Φ BOLT WITH A DOUBLE BEND HORIZONTALLY. FIVE STAR GROUT WAS PUMPED IN THROUGH SIDE HOLE. BOLT & NUT WERE TAPPED WITH HAMMER TO VIBRATE SAME. THERE WERE NO VOIDS.



#2

Pg. 7 of 15
NCR-2157

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BECHTEL

CALCULATION SHEET

DATE

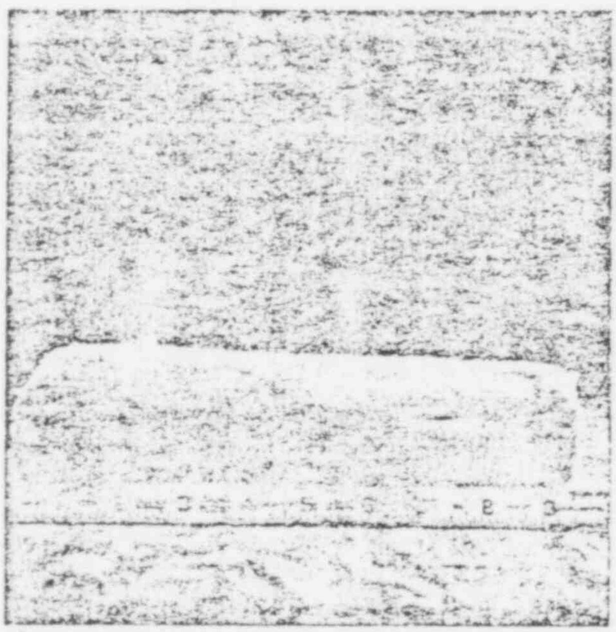
DESIGN BY DATE CHECKED BY SHEET NO. 6/17

PROJECT JOB NO.

SUBJECT CALCULATION NO. FILE NO.

BOLT #3 – 1 1/8" ϕ BOLT WITH A SINGLE BEND HORIZONTALLY. FIVE STAR GROUT WAS PUMPED IN THROUGH TOP HOLE, BOLT AND NUT WERE HAMMERED TO VIBRATE GROUT. THERE WERE NO VOIDS.

POOR ORIGINAL



#3

DS. 808 151
NCR-2157

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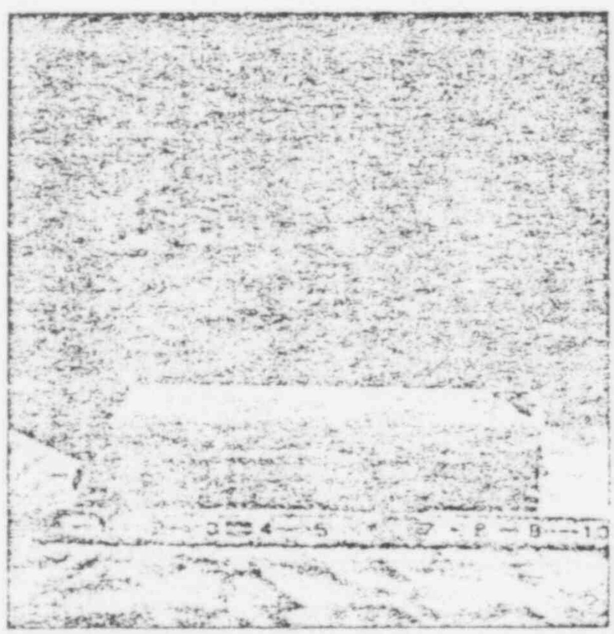
565232

BOLT #4 – 1 1/8" ϕ BOLT WITH SINGLE BEND UPWARD. FIVE STAR GROUT WAS PUMPED IN THRU SIDE HOLE. NO HAMMERING OF NUT/BOLT WAS DONE.

NOTE: SLIGHT VOID FORMED BY AIR POCKET AT HIGHEST POINT IN VERTICALLY SLOPED HOLE. THIS IS WHY ENGINEERING RECOMMENDS A VENT HOLE BE DRILLED TO HIGHEST POINT AS SHOWN IN ITEM #5 OF F.E. REPORT. HOWEVER, THIS VOID FORMED BEHIND NUT & BOLT AND DOES NOT AFFECT STRENGTH OF GROUTED BOLT.



#4

CALCULATION SHEET

DATE

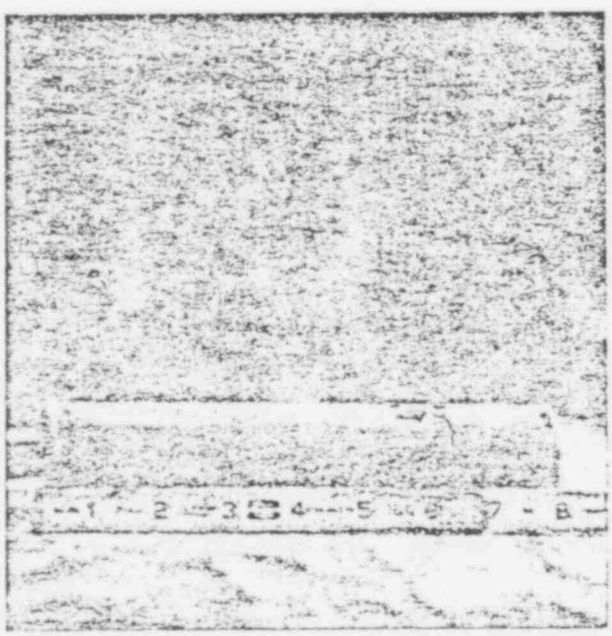
DESIGN BY DATE CHECKED BY SHEET NO. 8/12

PROJECT JOB NO.

SUBJECT CALCULATION NO. FILE NO.

BOLT #5 - 5/8" ϕ BOLT WITH SINGLE BEND HORIZONTALLY. EMBECO'S "MASTERFLOW 713" GROUT WAS PUMPED IN THRU BOTTOM HOLE. NO TAPPING/HAMMERING OF BOLT/NUT WAS DONE.

NOTE: A SLIGHT AIR POCKET WAS FORMED BETWEEN NUT ON BOLT AND WALL OF CONCRETE. IN OTHER SAMPLES WHERE SIMILAR POCKETS FORMED, SLIGHT HAMMERING OF NUT/BOLT CAUSED SLIGHT VIBRATION OF SAME TO ELIMINATE VOID.



#5

pg-10 of 15
NCR-2157

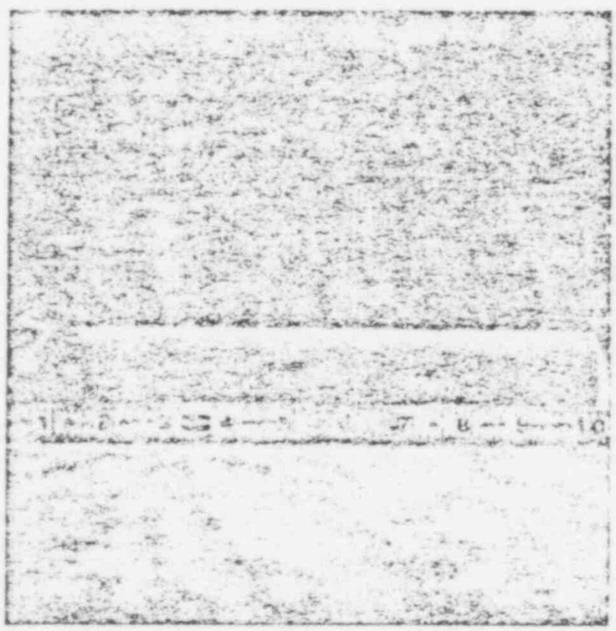
CALCULATION SHEET

DESIGN BY ______ DATE ______ CHECKED BY ______ DATE ______ SHEET NO. 9/12

PROJECT ______ JOB NO. ______

SUBJECT ______ CALCULATION NO. ______ FILE NO. ______

BOLT #6 – 5/8"ϕ BOLT WITH A SINGLE BEND UPWARD. EMBECO'S "MASTERFLOW 713" GROUT WAS PUMPED IN THRU TOP HOLE. THE BOLT WAS NOT HAMMERED TO VIBRATE. NO VOIDS.



#6

PJ-11 of 15
NCR-2157

237
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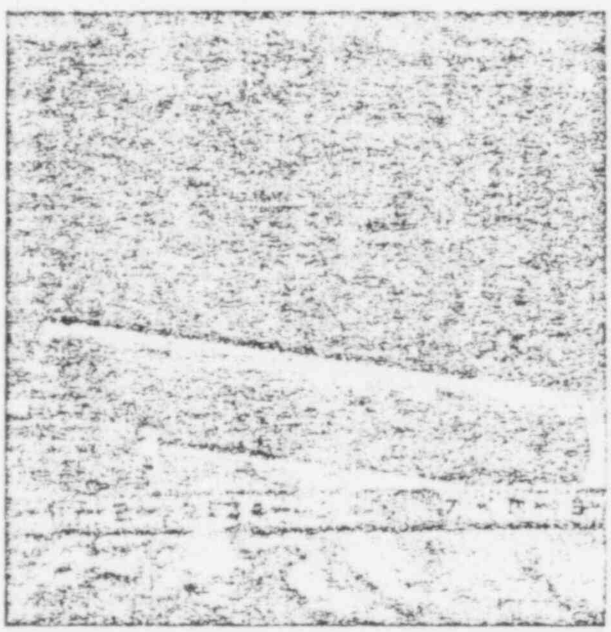
CALCULATION SHEET

DESIGN BY	DATE
CHECKED BY	SHEET NO. 10/12
PROJECT	JOB NO.
SUBJECT	CALCULATION NO.
FILE NO.	DATE

BOLT #7 - 5/8"φ BOLT WITH A DOUBLE BEND UPWARD (sketch) WAS FILLED WITH EMBECO'S "MASTERFLOW 713" THRU THE TOP HOLE. THE BOLT WAS NOT HAMMERED. NO VOIDS.

POOR ORIGINAL



#7

95-12 of 15
NCR-2157

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BECHTEL

CALCULATION SHEET

DATE ______

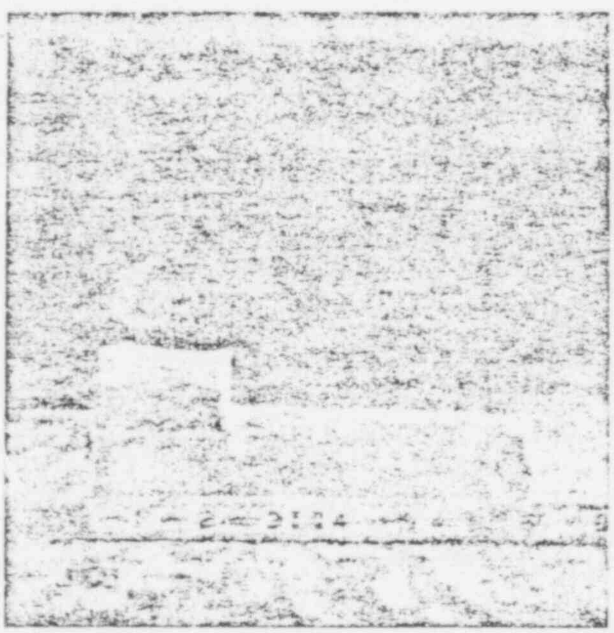
DESIGN BY ______ DATE ______ CHECKED BY ______ SHEET NO. 11/12

PROJECT ______ JOB NO. ______

SUBJECT ______ CALCULATION NO. ______ FILE NO. ______

BOLT #8 - 5/8" ϕ BOLT WITH A DOUBLE BEND DOWNWARD WAS FILLED WITH FIVE STAR GROUT THRU THE BOTTOM HOLE. THE BOLT WAS HAMMERED SLIGHTLY TO VIBRATE SAME.

NOTE: THE CONCRETE ARRANGEMENT IS DUE TO THE USE OF PLEXIGLASS CYLINDERS INSTALLED "PIGGY BACK" DUE TO DOUBLE BEND IN BOLT.



#8

Pg- 13 of 15 (NCR-2157)

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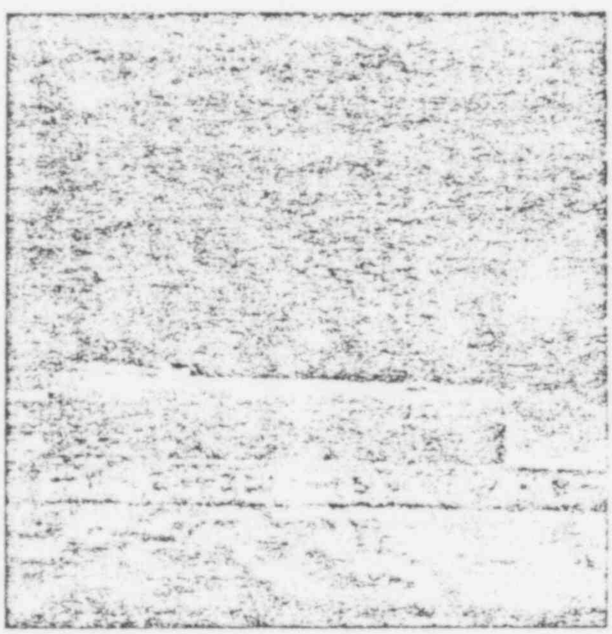
CALCULATION SHEET

BOLT #9 – 5/8" ϕ BOLT WITH A DOUBLE BEND HORIZONTALLY WAS FILLED WITH FIVE STAR GROUT THRU THE TOP HOLE. THIS BOLT WAS NOT HAMMERED TO VIBRATE.

NOTE: A SLIGHT AIR POCKET FORMED AT TOP OF GROUT HOLE. THE "LUMP" THAT APPEARS IN PICTURE IS A "PIGGYBACK" CYLINDER SECTION TO RECEIVE DOUBLE BEND IN BOLT (ON FAR SIDE OF MAIN GROUTED SECTION).



#9

Pg 14 of 15
NCR-2157

Attachment to NCR #2157
Log # 28332

BECHTEL

FIELD INSPECTION REPORT

3. RECORD CONTROL
CONTROL NO. ______
FILE NO. ______

1. PROJECT NO. 7220 2. DATE 6/27/79 PAGE 1 OF 1

4. ITEM INSPECTED Repair work of superficial voids on Hanger # 619-6-1 (26-0HBC-19-41).

5. LOCATION Aux. Bldg. (East Wing Wall) El. 596'± 6'E/7.9, 6'3/C

6. TYPE OF INSPECTION Visual

7. STANDARD / CODE / PROCEDURE / DRAWING / SPECIFICATION Specification 7220-C-231, Rev. 17, Section 17.0; Specification 7220-C-306, Rev. 4, Sect. 7.0

8. INSPECTION EQUIPMENT USED Flashlight, Hammer & Chisel, Tape Measure

9. RESULTS OF INSPECTION SATISFACTORY ☑ UNSATISFACTORY ☐

10. ACTION TAKEN IF UNSATISFACTORY

Distribution
White — QC Files
Canary — Originator

11. ENGINEER Kathy Gunser
KG 6/27/79

pg. 15 of 15
NCR-2157

2514 (7-73) QC-G1-1

565229
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DUPLICATE DOCUMENT

X BECHTEL

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NONCONFORMANCE REPORT

S/U #'s 1BC74 2BC4

1. PROJECT NAME: Midland
JOB NO.: 7220
19. NO.: 2159
20. PAGE 1 OF 2

2. UNIT(S): 1+2
3. DRAWING/PART NO.: Archer-Darling 3287-3
REV: D
4. ITEM DESCRIPTION: Man. Oper. Valve Limit Switches
5. ITEM LOCATION: 568' Aux. Bldg.

6. P.O. OR SPEC NO.: 7220-M-125.C
7. SERIAL NO.: 5205-14-1-6, 5205-14-1-3
8. REPLACEMENT PART P/N: N/A REV: N/A SER NO.: N/A
9. SOURCE: Supplier
10. CONTRACTOR/SUPPLIER: Archer-Darling

11. INSPECTION CRITERIA (✓) DWG ( ) SPEC ( ) OTHER
IR NO.: N/A NO. See Bk #3
12. ASME AUTHORIZED INSPECTION REQ'D ( ) YES (✓) NO
13. SKETCH ATTACHED ( ) YES (✓) NO
14. Discovered During ( ) Rec'g (✓) Const ( ) Test
15. Equip Furnished By ( ) Client (✓) Eng ( ) FLD

16. NONCONFORMING CONDITION: Archer-Darling drawing 3287-3, Rev. D requires a 17C-311CC type limit switch for the upper limit switch and a 17C-321CC type limit switch for the lower limit switch for valves 412-631 (Item 36.1) and 413-630 (Item 36.2). Quality Control and Field Engineering has determined that the lower limit switch (which is Q-listed #'s 4.127 + 4.137 2 Held Tags applied to valves

17. REPORTED BY: C. R. Fugate DATE: 5-4-79
18. VALIDATED BY: W. Barclay DATE: 5-4-79

21. ROUTING: (X) TO FIELD ENGINEERING ( ) TO OTHERS (SPECIFY)

22. (X) Field Engineering Disposition ( ) Field Engineering Recommended Disposition to Project Engineering

Switches will be instaled in there proper locations.

Douglas Bowlley
6-18-79

23. PROJECT ENGINEERING DISPOSITION

POOR ORIGINAL

24. DISPOSITION CONCURRENCE

rework ✓ | reject | repair | use as is

W. Nuer ABS 6-19-79 — PROJECT FIELD ENGINEER, DATE

PROJECT ENGINEER / PROJ CONSTR ENGINEER: W. S. Bowlley 6/3/79 — DATE

AUTHORIZED INSPECTOR — DATE

25. DISPOSITION RESULTS

Switch's have been changel to there proper positions.

R. L. Marrio 6/25/79

26. QC ACCEPTANCE: W. M. [illegible] 6/23/79
QC ENGINEER — DATE

AUTHORIZED INSPECTOR — DATE

565240 242

Block #16 continued:

IDENTIFIED AS A LOWER LIMIT SWITCH) ON VALVE 412-031 [RMH 1/25] IS ACTUALLY AN UPPER LIMIT SWITCH WHICH IS IDENTIFIED INCORRECTLY BY THE VENDOR. ALSO THE UPPER LIMIT SWITCH (WHICH IS IDENTIFIED AS AN UPPER LIMIT SWITCH) ON VALVE 413-030 [RMH 1/26] IS ACTUALLY A LOWER LIMIT SWITCH WHICH IS IDENTIFIED INCORRECTLY.

565 ~~244~~ 243

POOR ORIGINAL

BECHTEL

NONCONFORMANCE REPORT

S/U: Nontestable

1. PROJECT NAME: Midland
JOB NO.: 7220

19. NO. 2167
20. PAGE 1 OF 3

2. UNIT(S)	3. DRAWING/PART NO.	REV	4. ITEM DESCRIPTION	5. ITEM LOCATION
1	E632	6	Conduit Support	Aux, 685', unit 1

6. P.O. OR SPEC NO.	7. SERIAL NO.	8. REPLACEMENT PART	9. SOURCE	10. CONTRACTOR/SUPPLIER
NA	NA	P/N NA REV NA SER NO. NA	construction	NA

11. INSPECTION CRITERIA (X) DWG ( ) SPEC ( ) OTHER — IR NO 1AFE002 & NO 1AFE001
12. ASME AUTHORIZED INSPECTION REQ'D ( ) YES (X) NO
13. SKETCH ATTACHED (X) YES ( ) NO
14. Discovered During ( ) Rec'g (X) Const ( ) Test
15. Equip Furnished By ( ) Client ( ) Eng (X) FLD

16. NONCONFORMING CONDITION: E42, rev 40, sh 329 specifies P1000 and P3300 for use on type 11 supports. There is no provision for T.S. to be cantilevered from T.S. on a type 11. Contrary to the above, a type 11 support has been installed on 685' with such a cantilever. Plate size is 13"X13" with a 14" 3"X3"X1/4" T.S. welded to it. Cantilevered from this first T.S. is a second T.S. 3"X3"X3/16" that is 15" long. Onto the

17. REPORTED BY: C.L. Cameron DATE 5/7/79
18. VALIDATED BY: [signature] Barclay DATE 5-8-79

21. ROUTING: (X) TO FIELD ENGINEERING ( ) TO OTHERS (SPECIFY)

22. ( ) Field Engineering Disposition (X) Field Engineering Recommended Disposition to Project Engineering

Support to be revised per E-42

[signature] 5/25/79

23. PROJECT ENGINEERING DISPOSITION

Project engineering concurs with field engineering recommendation to revise the support in accordance with E-42 typical supports.

J. [signature] 6/8/79
RS

24. DISPOSITION CONCURRENCE

rework	reject	repair	use as is
X			

[signature] RGS 6-11-79 — PROJECT FIELD ENGINEER — DATE
J.R. Barinski / RLC 6-11-79 — PROJECT ENGINEER — DATE
[signature] Russell for 6/14/79 — PROJ CONSTR QC ENGINEER — DATE
AUTHORIZED INSPECTOR — DATE

25. DISPOSITION RESULTS

field has removed support.
[signature]
6-25-79

26. QC ACCEPTANCE
[signature] 6-25-79
QC ENGINEER — DATE
AUTHORIZED INSPECTOR — DATE

POOR ORIGINAL

5652424

Block 16 cont.

second T.S. is stitch-welded a length of single unistrut. Two four-inch conduits are attached to this support: 1AFE002 and 1AFC001. Support location: 699', 1'-9" west of the 6.6 wall on the South face of the H wall.

Q-List # 3.006 1 Hold Tag Applied Hold for Engineering Disposition

5652~~43~~ 245

POOR ORIGINAL

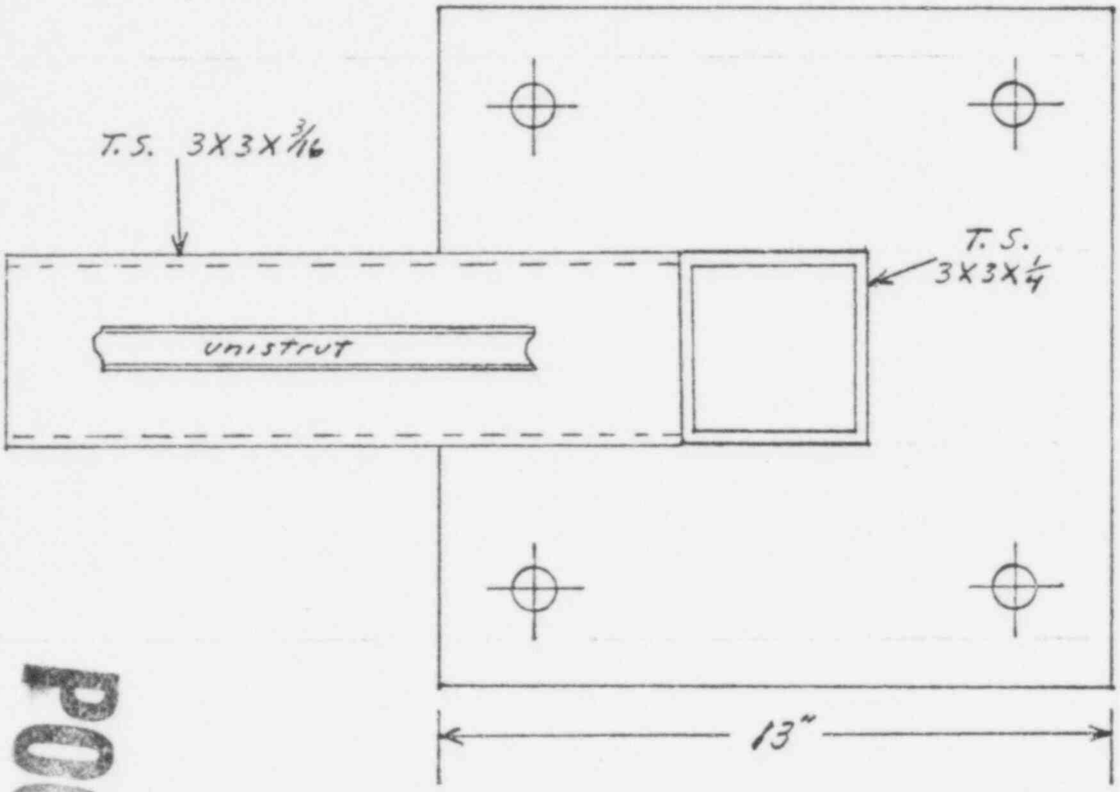
CALCULATION SHEET

DATE ______ NCR-2167

DESIGN BY ______ DATE ______ CHECKED BY ______ SHEET NO. 3 of 3

PROJECT ______ JOB NO. ______

SUBJECT ______ CALCULATION NO. ______ FILE NO. ______



Not To Scale